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Vocabulary control and information technology

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Revised version of a paper presented at a weekend seminar of the Library Association Cataloguing and Indexing Group entitled 'Subject indexes: production and use in an IT age', Chester, UK, 8–11 April 1983.

Writers on library automation such as Borko and Lancaster foresee an end to human-based indexing and classification. They anticipate a time when users will be able to direct their subject enquiries at machine-held files of keywords extracted automatically from the 'natural uncontrolled language of the document'[1]. Borko considers that this will allow the user 'to identify a few relevent items from among many thousands and display them on the video screen in seconds'[2].

This paper reviews these claims, and then examines a genuine case where the computer followed the procedures proposed by these teachers. It also considers how a measure of vocabulary control, based on recommendations in some recent national and international standards, would have avoided the entirely irrelevant output produced by the machine.

This paper was given at the conference cited above on the subject approach in an age of information technology, which I shall interpret narrowly as the use of computers to handle tasks, such as cataloguing and indexing, that were previously regarded as the exclusive province of all-too-human librarians and information officers. We would probably all agree that computers have introduced significant new factors into indexing, calling for changes not only in our techniques but also in our attitudes to the products of indexing. A few researchers see these changes, dramatically, as signs of an end to what might be called 'traditional indexing' – that is, indexing based on terms assigned by human indexers and involving some kind of vocabulary control. Taking this as a starting point, I would like to approach this topic from three different but related angles:

1. The case against vocabulary control in an IT age, quoting arguments from recognised authorities in this field.
2. The implications of some of the alternatives offered by these authorities, judged from the viewpoints of both the user and the provider of information.
3. Adopting a different stance, some reasons why computers are, indeed, likely to change our attitudes to indexes and indexing, but by increasing rather than decreasing the need for vocabulary control of one kind or another. I shall relate this view, where appropriate, to recent trends towards

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standard codes of practice for indexing in general and vocabulary control in particular.

A typical argument against the use of traditional human-based indexing in the age of the computer was presented by Harold Borko, a teacher at UCLA (University of California at Los Angeles), in a paper at the FID/CR (Federation Internationale de Documentation/Classification Research) 4th International Study Conference held at Augsburg (West Germany) in 1983[3]. Borko gave his impression of a library of the automated future, which he called a 'dynamic library'. This concept is based on the following assumptions:

1. The catalogue will consist only of MARC-type records held in the computer, with selected fields assigned to inverted files to allow online searching by authors, titles, and so on. This hardly rates as a forecast; it is already happening in some agencies.
2. It is assumed that subject analysis and indexing will be carried out entirely by the computer. Part of the text of every document, ranging from an abstract to the whole text in some cases, will be input to the computer. The machine will then extract keywords automatically from this free text and assign these, too, to inverted files, ready for online searching. This is also happening in some agencies, but not yet (as far as I know) in a working library.
3. Borko assumes that the user should not have access to the shelves; instead, 'browsing in the dynamic library will necessarily take place at the computer terminal'[4]. Borko sees this development as the end of the road for shelf-order classification; he suggested that, 'The library's collection could be arranged by accession number, or alphabetically by authors, or divided, for convenience, into broad categories'[5].
4. Subject searches will consist of matching terms from readers' enquiries against the inverted files of keywords extracted automatically from what Borko calls the 'natural uncontrolled language of the document'[6]. He reckons that this should allow the user 'to identify a few relevant items from among many thousands, and display them on the video screen in seconds'[7].

Borko claims that this approach to subject searching in a fully-automated library (lacking what we usually understand as 'vocabulary control') will be cheaper than manual indexing and equally effective. To support these claims, he reports that:

> 'Experimental tests have shown that the retrieval effectiveness of manual indexing, using a controlled vocabulary and an hierarchically organised thesaurus, is *not any better* than retrieval with indexes derived from the uncontrolled language of the document. Natural language indexing is also less expensive'[8].

Whatever our views on this matter, we have to take these claims seriously, especially in a time of economic stress when library managers are forced to examine any proposal that might allow them to divert resources, such as the costs of indexers, to other needs, such as acquisition. Managers are usually more concerned with their own costs than the user's, and they might wonder how much they would actually save if the salaries of indexers have to be diverted into the costs of keyboarding at least part of the text of every document judged as worth retrieving. We should also consider the user's costs, especially if these experimental automatic systems turn out to be less effective and more time wasting (and therefore more expensive) than our present techniques. Within this context, we should take account of a note of caution later in Borko's paper, where he observed that: 'although the value of automatic indexing has been established experimentally, the hazards of extrapolating laboratory results to an operational system must be recognised'[9].

Some of these hazards were encountered by a librarian at Middlesex Polytechnic when she used the SDC ORBIT system to deal with a teacher's request for documents on 'yellow light'. This jargon term refers to European Community requirements concerning legal minimum levels of illumination in some kinds of working areas. No results were obtained when 'yellow light' was used as a search term in a range of databases dealing with safety, law, working conditions, and so on. The librarian therefore started again, using standard Boolean functions (AND, OR, NOT), combined with truncation, to link together terms such as 'light', 'law', 'legal', 'legislation', etc. The machine reported a total of thirty-two hits, and these were printed offline and sent through the mail. Not a single item was relevant.

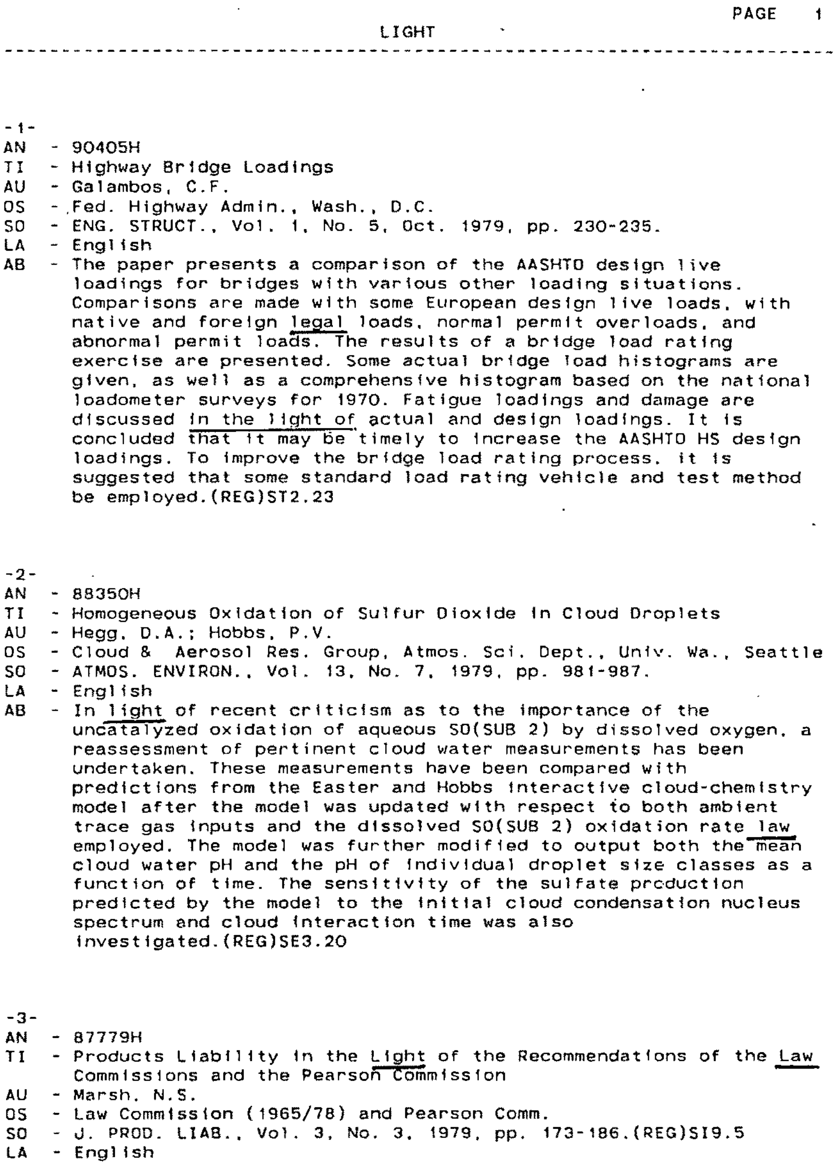
The extent to which the items retrieved should be rated as failures can be judged from a glance at the examples reproduced in Figures 1 and 2. These citations, which are completely typical (they were not especially selected), show that the system had, in fact, behaved exactly as Borko had specified. Terms that formed parts of a search statement, such as 'light' and 'law' or 'legal', were traced successfully in the free text of titles and abstracts, and each co-occurence was reported as a hit. But we seem to have fallen short of Borko's claim that the computer will identify 'a few relevant items from among many thousands'[10].

Other advocates of automatic indexing are aware that these false drops are likely to occur. Lancaster, at another FID conference[11], warned us that false coordinations are possible, but added, as an assurance:

> 'It is undoubtedly more cost effective, although perhaps less aesthetically pleasing to put up with a few irrelevant items than to build in rather elaborate and costly procedures to avoid them. It is not, after all, very costly or inconvenient to recognise a few irrelevant items in the search output and to dispose of them'.

Real-world experience suggests that Lancaster has treated this problem far too casually. He referred to the chance of retrieving 'a few irrelevant items', but a few can amount to dozens or more if a search is run against one of the larger databases. From the viewpoint of the database manager it is doubtless cheaper to ignore the need for checks that might allow the user to detect false drops before citations are printed, but these management savings will then be translated into user costs, measured in terms of wasted time and frustration. The examples of print-out shown in Figures 1 and 2 may not be completely typical; most searches retrieve at least some relevant items. Nevertheless, we need an occasional genuine example to offset the extreme (and often simplistic) claims made by some proponents of automatic indexing. We can also now use these citations as raw materials for a kind of failure analysis, and try to establish what went wrong with these outputs and whether some kind of vocabulary control might have helped.

FIGURE 1. *SDC* ORBIT *print-out.*



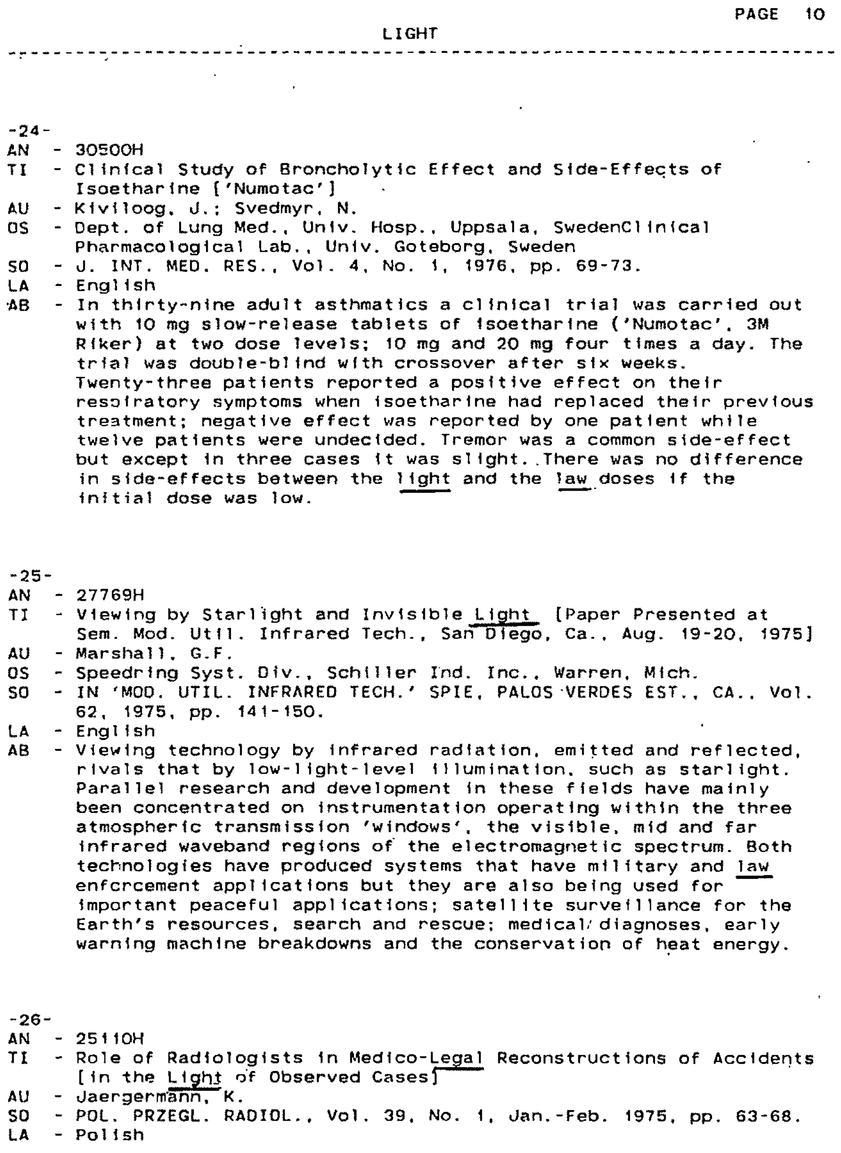
```
                                                                 PAGE    1
                                  LIGHT
---------------------------------------------------------------------------


-1-
AN  - 90405H
TI  - Highway Bridge Loadings
AU  - Galambos, C.F.
OS  - Fed. Highway Admin., Wash., D.C.
SO  - ENG. STRUCT., Vol. 1, No. 5, Oct. 1979, pp. 230-235.
LA  - English
AB  - The paper presents a comparison of the AASHTO design live
      loadings for bridges with various other loading situations.
      Comparisons are made with some European design live loads, with
      native and foreign legal loads, normal permit overloads, and
      abnormal permit loads. The results of a bridge load rating
      exercise are presented. Some actual bridge load histograms are
      given, as well as a comprehensive histogram based on the national
      loadometer surveys for 1970. Fatigue loadings and damage are
      discussed in the light of actual and design loadings. It is
      concluded that it may be timely to increase the AASHTO HS design
      loadings. To improve the bridge load rating process, it is
      suggested that some standard load rating vehicle and test method
      be employed.(REG)ST2.23


-2-
AN  - 88350H
TI  - Homogeneous Oxidation of Sulfur Dioxide in Cloud Droplets
AU  - Hegg, D.A.; Hobbs, P.V.
OS  - Cloud &  Aerosol Res. Group, Atmos. Sci. Dept., Univ. Wa., Seattle
SO  - ATMOS. ENVIRON., Vol. 13, No. 7, 1979, pp. 981-987.
LA  - English
AB  - In light of recent criticism as to the importance of the
      uncatalyzed oxidation of aqueous SO(SUB 2) by dissolved oxygen, a
      reassessment of pertinent cloud water measurements has been
      undertaken. These measurements have been compared with
      predictions from the Easter and Hobbs interactive cloud-chemistry
      model after the model was updated with respect to both ambient
      trace gas inputs and the dissolved SO(SUB 2) oxidation rate law
      employed. The model was further modified to output both the mean
      cloud water pH and the pH of individual droplet size classes as a
      function of time. The sensitivity of the sulfate production
      predicted by the model to the initial cloud condensation nucleus
      spectrum and cloud interaction time was also
      investigated.(REG)SE3.20


-3-
AN  - 87779H
TI  - Products Liability in the Light of the Recommendations of the Law
      Commissions and the Pearson Commission
AU  - Marsh, N.S.
OS  - Law Commission (1965/78) and Pearson Comm.
SO  - J. PROD. LIAB., Vol. 3, No. 3, 1979, pp. 173-186.(REG)SI9.5
LA  - English
```

FIGURE 2. *SDC* ORBIT *print-out.*



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                                                          PAGE  10
                                  LIGHT
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-24-
AN  - 30500H
TI  - Clinical Study of Broncholytic Effect and Side-Effects of
      Isoetharine ['Numotac']
AU  - Kivilloog, J.; Svedmyr, N.
OS  - Dept. of Lung Med., Univ. Hosp., Uppsala, SwedenClinical
      Pharmacological Lab., Univ. Goteborg, Sweden
SO  - J. INT. MED. RES., Vol. 4, No. 1, 1976, pp. 69-73.
LA  - English
AB  - In thirty-nine adult asthmatics a clinical trial was carried out
      with 10 mg slow-release tablets of isoetharine ('Numotac', 3M
      Riker) at two dose levels; 10 mg and 20 mg four times a day. The
      trial was double-blind with crossover after six weeks.
      Twenty-three patients reported a positive effect on their
      respiratory symptoms when isoetharine had replaced their previous
      treatment; negative effect was reported by one patient while
      twelve patients were undecided. Tremor was a common side-effect
      but except in three cases it was slight. There was no difference
      in side-effects between the light and the law doses if the
      initial dose was low.


-25-
AN  - 27769H
TI  - Viewing by Starlight and Invisible Light  [Paper Presented at
      Sem. Mod. Util. Infrared Tech., San Diego, Ca., Aug. 19-20, 1975]
AU  - Marshall, G.F.
OS  - Speedring Syst. Div., Schiller Ind. Inc., Warren, Mich.
SO  - IN 'MOD. UTIL. INFRARED TECH.' SPIE, PALOS VERDES EST., CA., Vol.
      62, 1975, pp. 141-150.
LA  - English
AB  - Viewing technology by infrared radiation, emitted and reflected,
      rivals that by low-light-level illumination, such as starlight.
      Parallel research and development in these fields have mainly
      been concentrated on instrumentation operating within the three
      atmospheric transmission 'windows', the visible, mid and far
      infrared waveband regions of the electromagnetic spectrum. Both
      technologies have produced systems that have military and law
      enforcement applications but they are also being used for
      important peaceful applications; satellite surveillance for the
      Earth's resources, search and rescue; medical diagnoses, early
      warning machine breakdowns and the conservation of heat energy.


-26-
AN  - 25110H
TI  - Role of Radiologists in Medico-Legal Reconstructions of Accidents
      [in the Light of Observed Cases]
AU  - Jaergermann, K.
SO  - POL. PRZEGL. RADIOL., Vol. 39, No. 1, Jan.-Feb. 1975, pp. 63-68.
LA  - Polish
```

It is not difficult to detect at least three possible reasons for these failures, each falling within a broad definition of vocabulary control.

The first relates to an area usually known as 'subject analysis', which takes us into the heart of any system where human indexers exercise judgements when choosing indexing terms to summarise the subjects of documents. This involves the selection of some terms and the rejection of others – an act of discrimination clearly beyond the capabilities of the computer that produced the examples shown in Figures 1 and 2. The machine performed its expected task, and matched a set of terms comprising an enquiry against the natural language of titles and abstracts, but it could not infer that a word such as 'light' does not refer to a form of physical energy when it occurs as part of an idiomatic phrase such as 'in the light of. . .' (see Citations 1, 2 and 3 in Figure 1). There are no reasons for supposing that computers will not be able to make this distinction at some time in the future – potentially useful systems are being developed in the interrelated fields of automatic translation and artificial intelligence. At the moment, however, indexers tend to be more reliable, and they perform this kind of discrimination particulary well and quite literally without conscious effort.

There is, of course, more to indexing than recognising an occasional idiom. The subject of every document represents an aggregate of several concepts. Given the aim of indexing by summarisation, only some of these concepts have value as retrieval keys and should be expressed as indexing terms. The trick is to identify this subset, using techniques that lead consistently to a choice of terms that readers would regard as potentially useful. This notion of subject analysis is central to our work as indexers and classifiers, but it seems to have received surprisingly little attention in textbooks on the subject approach. This even applies to manuals written for particular systems, such as PRECIS or the Dewey Decimal Classification – these offer expert advice on how to index or class a document on, say, 'Permitted levels of light in offices', but they have little or nothing to say on how we are supposed to find out, in the first place, that this is what the author was talking about.

As far as I am aware, the clearest introduction to subject analysis is contained (perhaps unexpectedly) in two relatively recent standards published by BSI[12] and the ISO[13]. The techniques described in these standards are regarded as applicable in any agency where indexing is based on the concept of summarisation and indexers work with, and contribute to, a controlled vocabulary. Identifying the principal concepts in a document is seen as the search for answers to a set of stock questions such as:

- Did anything happen?
- If so, to whom or what did it happen?
- Where did it happen?
- Was an identified agent or instrument involved?
- Did the author consider the topic from a special viewpoint not normally associated with the topic (for example, a sociological study of religion)?

Not all these questions will necessarily lead to answers – we could hardly say that anything 'happened' when indexing, say, an atlas of Italy. When an answer occurs, however, it will usually point towards a concept that is at least potentially useful as an indexing term.

Let us now return to our failure analysis, and try to establish a second reason why the computer produced the irrelevant citations seen earlier. We have already considered how an indexer, using a native speaker's flair for language, would discriminate between two different meanings of the word 'light': firstly, when it occurred as part of an idiom ('in the light of'), and secondly when it referred to a kind of physical energy. If we now turn to Citation 25 (Figure 2), we shall see the term 'light' used in the sense intended by the enquirer: that is, as a means for illuminating a space. The term 'law' also occurred with its usual meaning, and indicated an instrument for social regulation or control. Nevertheless, it is clear from the abstract that the author was dealing (among other things) with *light as a possible instrument for law enforcement,* whereas the user needed documents on *law as an instrument for regulating light levels* in certain environments. In effect, the roles of these concepts are reversed in the enquiry and the item retrieved by the computer. Consequently, the citation deals with a completely different subject.

This kind of problem, which we might call 'role confusion', is not peculiar to automatic indexing. It is likely to occur in any system where terms (whether selected by an indexer or a computer) are assigned as keywords without showing how they are interrelated in a grammatical sense. Again, it is worth reporting that advances in artificial intelligence suggest that computers might, within a reasonable time, be capable of making inferences concerning the roles of terms in free text. It is also beyond dispute that an indexer with a normal flair for language can, with almost no conscious effort, recognise and distinguish among the different roles that a given concept can assume. Given a system such as PRECIS, these roles can also be conveyed to the user in the form of meaningful, pre-co-ordinated subject statements, not only on the printed page but also online. Readers familiar with PRECIS as the source of printed indexes in the *British national bibliography (BNB)* and other publications may not be aware that similar levels of pre-co-ordination can be displayed on demand to BLAISE (British Library Automated Information Service) users searching the UK-MARC files. These files are searched through keywords linked by the usual Boolean operators (AND, OR, NOT), but although these functions allow the user to identify records where a given set of terms has co-occurred in designated fields, they cannot show *how* the concepts were interrelated. If, for example, we use PRECIS words to search for documents on 'women's attitudes', we can input WOMEN AND ATTITUDES. The computer will then report over twenty citations, but the user cannot yet distinguish between the documents that deal with 'attitudes *of* women' (the subject of the enquiry), and a different set that deals with 'attitudes *to* women'. However, this distinction can be made before any catalogue entries are retrieved by requesting a display of the 'verbal feature' associated with every record. The 'feature' is the string of words that follows every class number in *BNB* and similar classified bibliographies. It is constructed by the computer out of the terms and adjuncts in the PRECIS string. Some typical results can be seen in Figure 3, which shows that:

– citations numbered 1, 4, 8, 9 and 10 would not be relevant, they deal with 'attitudes *to* women';
– probable hits have occurred, however, with the remaining citations. These deal with 'attitudes *of* women' in one way or another, and although some of them may be too specific, this, too, can be judged by reading the features.

Access to this facility is one of the reasons why PRECIS has been adopted by the National Film Board of Canada for its online subject approach.

We should now return to our failure analysis and consider a third potential reason why the computer retrieved irrelevant citations when searching for items on 'yellow light'. Citation 24 (Figure 2) shows that the word 'light' (underlined) occurred with one of its standard meanings – that is to say, it did not form part of an idiom. In this case, however, it functioned as an adjective (the opposite of 'heavy') and actually qualified 'doses', printed four words later. To a certain extent the retrieval of 'light' as an adjective, when the user intended its meaning as a noun, resembles the role confusion problem considered above. The same solution would also work in this case – the display of a pre-co-ordinated subject statement, such as a feature, would allow the user to distinguish immediately between 'light' as a noun or an adjective provided that the indexer had not attempted to use the adjective 'light' as an independent keyword in its own right.

This brings us to the area usually associated with the concept of vocabulary control – that is, control over the forms, and even the meanings, of indexing terms. An international standard[14] and at least one national standard[15] both recommend that adjectives should *not* be used as independent terms in an indexing language, although they can occur, attached to nouns, as parts of compound terms. These two standards cover the whole field of thesaurus construction, and only two or three of their sections deal specifically with vocabulary control, but these appear to break new ground (beyond any current textbook) in proposing internationally-agreed procedures, based upon language-independent principles, for regulating not only the forms of terms but also their semantic contents in many cases. Both standards are intended explicitly for use in agencies where human indexers are responsible for selecting and controlling the terms assigned to documents (with or without computer assistance). Within that context, their recommended procedures are based upon two working assumptions:

1. Concepts should be represented consistently, for retrieval purposes, by nouns or noun phrases. Other parts of speech, such as adjectives, verbs or participles, can occur as components of terms but not as terms in their own right;
2. Indexers should, for the sake of effective retrieval, work with a vocabulary of 'preferred terms'. A concept can sometimes be expressed by more than one term; for example, 'educational attainment' and 'academic achievement' can reasonably be treated as synonyms for retrieval purposes. When this occurs, one of these synonyms should be designated as the preferred term and assigned consistently to documents dealing with that concept. Any other term in the synonym set should be labelled as non-preferred; it can

> function as the source of a reference guiding the user towards its preferred equivalent, but it should not be assigned to documents.

I shall deal only briefly with the main recommendations in these standards, looking first at proposals for regulating the forms of terms (for example, singulars versus plurals), before reviewing some of the more difficult proposals that deal with the treatment of compound terms.

Both standards include easily followed guidelines, used in most English-language indexes, for determining whether a concept should be expressed by a plural or singular noun. Applying these rules calls for a basic distinction between terms classed as 'count nouns' in standard grammars, and others called 'non-count nouns'. Count nouns usually refer to physical things, such as 'cars', 'penguins' or 'indexers'; they can occur as part of a question based on 'how many?' (for example, 'how many indexers?'), but not 'how much?' (we are not likely to ask 'how much indexer?'). These are generally expressed as plurals in English language indexes. Non-count nouns refer to abstract concepts and actions (such as 'Christianity' and 'management'), and also materials (such as 'ink' and 'nitrogen'). These can form part of a question based on 'how much?' (for example, 'how much water?'), but not 'how many?' Non-count nouns should generally be expressed as singulars. Even those who agree with the aim of consistent, predictable terms in an indexing language might regard this rule as somewhat pedantic, yet it simply codifies a practice that is already common not only in indexes but also in everyday speech (at least in English). Readers familiar with Lewis Carroll will remember that he talked 'of many things':

'Of shoes, and ships, and sealing wax
  Of cabbages, and kings,
And why the sea is boiling hot,
  And whether pigs have wings'.

Here all the count nouns ('shoes', 'ships', etc.) occur as plurals, and the non-count nouns ('sealing wax' and 'sea') are expressed as singulars. The new international standard (ISO 2788) offers these rules as options rather than recommendations, to take account of a preference, in countries like France and Germany, for indexing terms expressed as singulars to match their forms in dictionaries. Nevertheless, many published indexes in these languages follow the rules described above, and the same rules seem to be applied, almost intuitively, when authors in western languages are choosing their titles.

It could be said that both standards have displayed remarkable courage in offering guidance on the treatment of compound terms — that is, terms consisting of more than one word. Terms of this kind have been a source of problems since indexing began, and we should not be surprised if the rules for dealing with them appear at first sight to be somewhat complex. The standards contain criteria for deciding whether a compound term, such as 'aircraft engines', should either be retained as a unit for indexing purposes or else factored into separate noun components, such as 'aircraft' and 'engines', each of which should then be assigned to the document as an independent retrieval key. On the whole both standards tend to favour factoring, judging from a general principle which states that indexing terms should express unitary concepts as far as possible.

Criteria for recognizing terms that should *not* be factored (that is, they should be retained in their compound forms) are relatively straightforward – the relevant clauses in both standards could be described as codified commonsense. These criteria are based on the principle that a term should be left alone if changing its form is likely to change its meaning or introduce an ambiguity into the indexing language. The criteria for recognising compound terms that should be factored are best explained by taking a single recommendation and applying it, step by step, to a compound term such as 'aircraft engines'.

STEP 1: The term should be analysed into a 'focus' and at least one 'difference'. The focus is always a noun, and indicates the general class of concepts to which the term as a whole refers – in this case, 'engines'. The difference refers to a characteristic which, added to the focus, specifies (or differentiates) a subclass of the focal concept. In this case the adjective 'aircraft' indicates a kind of 'engine'. We could have made the same distinction using more familiar terms such as 'noun' and 'adjective' rather than 'focus' and 'difference', but we need the special terms to explain how the same kind of logical analysis can also be applied to compound terms that cannot be classed as adjectival phrases, including single-word *Komposita* in German; (e.g. *Flugzeugmotoren,* the equivalent to 'aircraft engines'), and also prepositional phrases (such as the Italian equivalent, *motore di aeroplano*), where the noun *motore* serves as the focus, and the prepositional component, *di aeroplano,* functions as the difference.

STEP 2: The indexer should determine how the focus and difference are logically related. In the present case we can say that the difference, 'aircraft', represents a whole, and the focus, 'engines', refers to one of its parts.

STEP 3: A check with either of the standards will show that this particular relationship calls for the term to be factored. For example, the second edition of the International Standard (ISO 2788)[16] contains the following recommendation: 'A compound term should be factored if the focus refers to a property or part (including materials), and the difference represents the whole or possessor of that property or part'. Consequently, the term should be factored into two noun components, 'aircraft' and 'engines', and these should be assigned as separate terms to a document on this topic.

The other recommendations in these standards are based on broadly similar criteria. It is important to make the point that applying these criteria is far easier, in every case, than describing them.

From the indexer's point of view, these standards go a long way towards removing some of the more obvious causes of subjectivity in day-to-day indexing. They can also reduce a special kind of agonising that is sometimes associated with an indexing decision. This can be illustrated by assuming that an indexing agency, working without reference to one of these standards, admitted the term 'aircraft engines' into its indexing language. This adjectival construction should then stand as a model when dealing with later documents on, say, 'turboprop engines for freight aircraft', but an adjectival phrase such as 'freight aircraft turboprop engines' is clumsy, to say the least, and takes us towards a set of terms that will eventually collapse under its own weight. According to the standards, however, the term is an obvious candidate for factoring into separate 'permitted' noun phrases, such as 'freight aircraft' as one term and 'turboprop engines' as another. These simpler terms offer exactly the same retrieval keys; the subject remains undistorted; the indexing language is under a more predictable control.

Applying these rules clearly calls for a certain flair for language on the part of the indexer; nothing difficult, but we must bear in mind that exercising these skills takes time, and time costs money. Using these skills might even raise the job satisfaction of indexers, but I would stress that this is *not* why the rules were established. I shall therefore end by considering some of the wider implications of vocabulary control (the cons as well as the pros), and bringing these back into the context of information technology.

As we saw above, the use of rules for vocabulary control should lead to a simpler indexing language than we might have achieved without them. More importantly, these rules also offer a basis for higher levels of consistency and predictability. This would apply in the first place to the terms used in a single indexing agency – access to common rules and procedures should mean that a team of different indexers, or the same indexer on different occasions, stands more chance of achieving consistent results. This is useful as far as it goes, but consistency becomes even more important when we relate it to the notion of a common indexing language shared by different agencies in a network. If their vocabularies can also be based on common standards, we raise the chance that a term introduced by one of the agencies can be accepted and used by others. This, in its turn, improves the chance that users can conduct searches through different indexes or machine-held files without having to rewrite their search statements whenever they switch between files. One of the more obvious benefits of information technology is this new ability to sit at terminals in our offices and carry out searches in other peoples' files. This cannot be fully effective, however, if we have to rewrite a search statement whenever we switch from one database to another. Borko mentioned this as a problem in the context of free-text searching, and admitted that 'for the present, each database will need to be treated as a separate entity'[17]. He conceded that 'this does place an added burden on the user'[18]. It also applies to searches through files containing controlled vocabularies, including those supported by published thesauri, if the different indexing languages in a database were constructed according to local rules that are not also applied, nor even understood, by other contributors. This is one of the principal reasons why rules intended to regulate and reconcile the vocabularies of a range of different agencies should be issued under the imprint of a completely neutral authority, such as the International Organization for Standardization (ISO).

The rules we have considered so far would generally improve the chances of consistent practices within a single language community. The ISO, supported by Unesco, takes an even wider view, and anticipates access to files indexed in more than one natural language. This facility, which is already available through Euronet, should allow users to become aware of developments in their fields first reported in other languages. It is not suggested that we have to master a number of different languages before we can use these systems: we would still select retrieval terms in our own languages, but we would take them from a multilingual thesaurus, and they could then be switched, if necessary, into a common retrieval language through machine-held files of equivalences. This is an area where systems based on keywords extracted automatically from free text have absolutely nothing to offer; the effectiveness of multilingual networking depends at present entirely upon controlled vocabularies. With these aims in mind, the ISO has been involved for several years in a search for general principles that can be used to regulate the construction of multilingual thesauri, and a new International Standard, ISO 5964[19], has now been published. It should be noted that this work does not include rules for vocabulary control. Readers who need these rules are referred to the International Standard on monolingual thesauri[20] (considered above), which contains rules already endorsed by indexers with a wide range of language backgrounds, both Indo-European and non-Indo-European. This trend towards a general – and even international – system for vocabulary control, including rules for dealing with compound terms, is particulary important from the viewpoint of multilingual networking. International agencies concerned with multilingual indexing have found that it is far easier to translate indexing terms from one language to another if their compound terms have first been factored into simpler components, using the criteria in the new International Standard.

Finally, we should note certain disadvantages of these moves towards standard techniques for vocabulary control. One of the more obvious relates to some of the databases constructed before the standards were developed. The first step towards a standard can sometimes be seen as a reaction against the time-wasting indiosyncracies of certain older indexing languages, especially those that evolved before the value of consistent practice based upon general principles was fully realised. Ironically, this means that some of the better-known indexing systems – those that exposed the need for standards in the first place – are likely to become increasingly out of step. This point was made in an article in *Zeitschrift für Bibliotekswesen und Bibliographie*[21]. The author, Ernst Kohl, had studied a provisional edition of a system of subject headings that had been proposed as an all-German system. He pointed out that any librarian adopting these headings as an indexing language would not only be out of step with the German national standard and the equivalent international standard, but would also be at variance with many of the databases available to German users through Euronet. I see no obvious answer to this dilemma, which takes us out of the realm of indexing problems into the far more difficult area of indexing politics. The general lesson is clear – faced by the spread of information technology, and in particular the growth of networks, this is not an appropriate time to adopt or introduce an idiosyncratic, non-standard system.

Some individual users are also likely to be concerned by these recent trends. This applies particularly to that minority of users who would claim that a compound term such as 'aircraft engines' occurs so often in everyday speech that it should be admitted into an indexing language in its unfactored form, even though they recognise the advantages of factoring. Some would even claim that factoring is a kind of offence against 'natural' language. I can suggest two answers to this charge:

1. This appears in the standards. Both standards refer to compound terms that should be factored according to the rules but might be sought in their unfactored

forms. These terms should be admitted freely into an indexing language, but they should be designated as non-preferred terms and offered as sources of references directing the user towards simpler terms that are used in combination for retrieval purposes.

2. This relates to the obvious fact that we cannot, with the best will in the world, construct an indexing language that matches every expectation of every user. In cases where it appears that a choice must be made between an indexing language that some users would favour because it is 'stylish', and another that would be rated as good because it works, I suggest we should choose the latter and stand by that decision.

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On the fringe: working as a Health Education/Information Officer

Sue Lacey Bryant
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More library and information workers are likely to develop their careers 'beyond the fringe' of conventional librarianship. The post of Health Education/Information Officer (HE/IO) within Croydon Health Education Department demonstrates the potential to do so. The HE/IO acts as an information broker. Four main areas of activity are identified:

(1) developing the library and information service;
(2) meeting the information needs of colleagues;
(3) promoting a healthy life-style;
(4) promoting the Health Education Department's services.

The library has been reorganised. It is becoming a focus for other organisations seeking advice on handling information. The relevance of online searching is being tested. The creation of the post has enabled colleagues to concentrate on assessment, not retrieval, and has expanded the information dimension of the Department's work. The broker, like other Health Education Officers, undertakes research, liaison, planning, organisation, publicity and teaching. Library displays, reference packs of leaflets and information packs are used to promote health through libraries. Successful information brokerage requires wholehearted commitment to full participation in the work of a team, willingness to adapt and acquire new skills, and flexibility. Librarians and information workers could assume several different roles within Health Education Units.

Introduction

It is a truth yet to be universally acknowledged that more librarians are likely to look 'beyond the fringe' of conventional librarianship. Economic constraints on all types of library service are inevitably frustrating the career prospects of younger professionals. Naturally the temptation to quit traditional areas of practice in search of greater opportunities for innovation, and possibly for better conditions of service, is enhanced. Already just over 8 per cent of those British students leaving full-time courses at library schools who do gain employment in library/information work, move directly into fringe areas[1].

Information technology is advancing, opening up new opportunities for information workers. Meanwhile the trend for librarians to move into fresh areas of employment has been stimulated by the rapid growth of information and advisory services seeking to serve and/or lobby the public.

My own recent metamorphosis into a Health Education/Information Officer (HE/IO) can be viewed as part of this more general expansion of librarians beyond traditional forms of professional activity. It is within this national context that I

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offer a personal perspective on applying conventional skills in handling information to one fringe area.

The post of HE/IO within the Croydon Health Education Department emerged from the reshaping of an established post to incorporate an information function. This revision and redesignation derived from a perceived need not only to cope with the wealth of information relevant to the work of the Department but to exploit it and to make it available. My role might best be described as a variant of an 'information broker'. This term, as originally defined in the early 1970s, aptly embraces my function as a member of a team 'particularly responsible for promoting information flow and for exploiting the whole range of information forms and sources'[2]. It involves full participation in all the Department's activities, providing information to enquirers and colleagues (professional, technical and clerical) and promoting the service, in addition to undertaking health eduction activities.

Health education

The function of Health Education Units within the National Health Service (NHS) is to promote good health and prevent disease through the formal and informal education of both well and sick people. Definitions of health education are legion – each one reflecting a different philosophy. My own favourite is that 'Health Education is a process that bridges the gap between health information and health practices'[3]. Thus information is the starting point, fundamental to the process by which health educators seek to teach and motivate others to achieve optimum physical, mental and emotional health. Retrieving and disseminating information is a basic component of every HEO's role. It is then perhaps surprising that librarians have only just begun to join the ranks of other professionals, such as teachers and nurses, applying their skills in Health Education Units. HEOs support those who, in the course of their professional or voluntary work, have opportunities to explore health issues with others, individually or in groups. They include health visitors and teachers, youth leaders and social workers. HEOs plan in-service training, and provide information, advice and audiovisual resources as well as organising public events e.g. health fairs and exhibitions.

The growth of health education, like that of the public library movement before it, has been nurtured by a commitment to education and more especially by faith in the efficacy of self-help. Thus it is easy for those trained in library/information work to feel philosophically attuned to the practice of health education. This happy combination of a health education and information role has, in my case, led to me becoming something of a professional hybrid. Four main areas of activity can be identified:

(1) developing the library and information service;
(2) meeting the information needs of colleagues;
(3) promoting a healthy life style;
(4) promoting the Health Education Department's services.

Developing the library and information service

During the past two-and-a-half years the library has been catalogued and completely reorganised with valuable support from the South West Thames Regional Library Service. The stock has been updated and made much more accessible and now consists of some 3,500 books, 40 journals and 80 teaching packs. Recent publicity, through the publication of a library guide and a departmental newsletter, has attracted interest and more purposeful use of the library. The library is beginning to make some contribution to the thinking and practice of health educators in Croydon. The information needs of health educators can be broken down into four main areas:

- specific health topics, medical conditions and diseases;
- preventive strategies and teaching methods;
- social, statistical and epidemiological information at both a local and national level;
- identifying statutory and voluntary services, especially at a local level.

Often library users are looking for ideas on how to approach a subject with a particular individual or audience rather than simply for information. Thus titles written with the general reader in mind can be of most use.

Workshop sessions on sources of health information, the network of relevant information providers and the use of libraries are well received. A variety of groups attend these sessions from student health visitors and school nurses to trainee dental surgery assistants plus some interdisciplinary audiences. Participants readily recognise that some skill in information retrieval is fundamental to their effectiveness as practising health educators.

There are many opportunities to direct enquirers to the array of other sources of health and social information available. Not only does this encourage users to make local contacts, but it also ensures that the Department is not asked to duplicate information available elsewhere. It also helps to foster liaison with local organisations which is so essential to our own service.

One of my first tasks was to liaise with other library services in order to improve the quality of our service. We have benefited from support not just from the Regional Library Service and Croydon Public Library Service but also from the Health Education Council (HEC) Library.

Encouragingly the library is developing as a focus not just for other services within the NHS district seeking guidance on how to control their information resources, but also for other units and organisations beginning to identify their information needs. Thus the Department as a whole has developed closer liaison with those services and organisations which have contacted us for advice on handling information.

I am currently experimenting with an online terminal to test the relevance of computerised databases to the information needs of health educators. While medical databases have been at the forefront of the development of online services they are proving too narrowly based for the rather broader nature of health education, which encompasses aspects of education and the social sciences as well as medicine. However, a variety of new services, notably the DHSS (Department of Health and Social Security) database, combined with the diversity of databases now held on hosts such as Data-Star, have made online searching a more attractive proposition for those concerned with promoting health.

The Department also stocks leaflets and posters. By preparing visual catalogues their accessibility and retrieval has been improved.

Meeting the information needs of Health Education Officers

One of the fundamental issues for HEOs is to actually identify key health messages which are of practical benefit to the community in preventing disease and promoting good health. Given that the abundance of conflicting research evidence and the proliferation of misinformation as 'health' has become an increasingly marketed commodity, this is none too easy a task. The effective control of the printed material channelled through the Departmental Library and Information Service, combined with the use of standard information retrieval systems and publications, has certainly eased the burden on my colleagues, leaving them free to concentrate on assessment rather than retrieval.

Part of my function as an information worker is to undertake much of the initial 'spade work' of background research for Departmental projects, either withdrawing when an information input is no longer needed or participating further e.g. by helping to prepare written materials or to write up research. The very existence of my post and my participation in discussions and campaigns expands the information dimension of the Department's work. Many enquiries are prompted by this informal kind of brokerage.

Promoting a healthy lifestyle

The net of the Department's activities is cast very wide indeed. As a HE/IO it is not simply a question of operating as a librarian by another name. Research on information brokerage has shown that it is not enough just to support colleagues but is essential to be 'accepted as a full member of this group, taking part in some of its professional work'[4]. Accordingly I have participated in a great variety of activities with both individuals and groups. The range is broad from advising student nurses preparing a project on head lice to explaining the use of barrier methods of contraception to an anxious visitor at a health fair.

Currently I am closely involved with four programmes: nutrition education in primary schools, research on smoking among young people, promoting healthy exercise and co-ordinating health education for the elderly. My work as a HE/IO, like that of any other HEO, may include research, liaison, planning, organisation, publicity and teaching.

Since completing the Health Education Certificate course my teaching has extended beyond sessions on exploiting the information network to health topics such as healthy eating and smoking.

Libraries offer a means to reach people whose interest in health is expressed by choice, and in an environment free from many of the pressures and inhibitors which operate in a health service waiting room, or indeed in the schoolroom. Liaison between the Health Education Unit and Croydon Public Libraries has been very fruitful. We recognise that some readers who present specific medical/health enquiries to public library staff actually represent a degree of prior failure of patient education. Accordingly we are happy to offer any support requested from our more specialised stock.

The Health Education Unit has occasionally co-operated with the public library service in the past. Nevertheless the HEOs were unaware of the full extent of health related enquiries received in libraries, and had not realised the potential to disseminate health information through them. With the help of local librarians we have initiated several projects. Three particular strategies have evolved to make information about health available through libraries.

Displays

Several eye-catching visual displays promoting key aspects of a healthy lifestyle have been prepared for circulation around branch libraries. Each display is supported by free leaflets. The displays have been well received and the initiative has attracted local publicity.

Leaflets

The Department's leaflet stock is extremely varied, covering topics from safety to smoking, sex education to stress.

Three reference packs have been prepared to keep key library staff up to date with our leaflet stock. The collection of items relevant to the health information needs of housebound and handicapped readers is actively used by the Community Services Librarian with both readers and the wardens of residential homes. A second collection shows leaflets available in other languages. The third is held at the Postgraduate Medical Centre for the use of doctors and dentists.

This has proven to be a useful means of disseminating stock. Regular meetings to update each pack provide a valuable focus for liaison with key information providers in the District. In fact the same device is used to foster co-operation with Croydon Community Relations Council, and the approach is now being extended to other organisations including the Community Health Council and the Citizens Advice Bureau.

Information packs

These were developed in response to the demand from teenagers for information on those health topics which are a regular focus of school project work. This demand is stimulated, in part, by the activities of fellow HEOs in liaison with local schools.

Each library has been given a 'Health Box' – housing three information packs plus copies of key HEC booklets such as *Looking after yourself.* The packs were prepared in close co-operation with staff of the public library. Each one is a compilation of leaflets available from the Department.

Initial use of the packs was disappointing but recent publicity of the 'Health Box' has prompted interest not just from the target audience of secondary school teachers but also from two local centres, one concerned with religious/family education and the other with teaching persistent non-attenders. The usefulness of the packs will be reviewed at the end of the current school year.

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These three techniques of disseminating information have been a valuable innovation in the work of our Department.

This summer we hosted an open morning to give branch librarians an opportunity to look at some of the Department's resources and to meet the HEOs.

Promoting the Health Education Department's services

The outreach approach which is so fundamental to librarians and information workers is particularly relevant to marketing the image and services of the unit. Both a guide to the Health Education Service and a library guide have been produced. In December 1984 we launched a newsletter to improve our links with the front-line health educators with whom, and through whom, we work. The role of the HE/IO has recently extended to co-ordinating liaison between the Department and the local press. Another aspect of this promotional work is the preparation of occasional articles in other local newsletters either targeted at specific health educators e.g. youth workers, or at particular groups of the public e.g. housebound readers.

Conclusion

Working as a Health Education/Information Officer, on the fringe of librarianship, has helped me to appreciate that there is considerable potential for those trained in library and information work to pursue worthwhile and satisfying careers outside traditional services.

I believe that in future more information workers will move into this kind of fringe post, finding that there is much to be achieved by applying their skills in 'new' areas. However successful information brokerage depends upon wholehearted commitment to full participation in the work of a team, and willingness to adapt and acquire new skills. Many information workers will relish the opportunities presented to become an end-user, carrying the information process through to its logical conclusion by devising strategies and undertaking programmes based on the information available.

Flexibility is crucial to information brokerage and the ability to perceive and respond flexibly to changing needs and demands is a tremendous asset. Moreover it is essential to be able to recognise instances where, out of a team, one's own professional package of expertise is simply the most relevant to tackling a task for which none of you has been trained.

As a breed, librarians are all too hesitant to sound their trumpets. Those among the first to enter fresh fields of employment have a particular responsibility to market the skills of library and information workers.

Croydon is not the only unit to have recruited staff from librarianship and information work in the past couple of years. Clearly these workers could assume a number of different roles within Health Education Departments, from the administration of audiovisual resources to practising as a health educator. Moreover I believe that health education is only one of many fields of practice to which information brokers could make a significant contribution.

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An appraisal of national information policy in the United Kingdom

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The United Kingdom has a well-developed and comprehensive information infrastructure which has grown up over many years, but in the strict sense it has no coherent body of policy relating to information collection, storage, provision and supply.

Although the government plays a significant part in the funding and organisation of information services both nationally and sectorally, in general, information policy emerges most frequently as an ad hoc response to a particular need or situation. This is in part because of a reluctance on the part of government to intervene or interfere in areas where local resources or the private sector are able to make adequate provision for themselves, and in part possibly because of a British temperamental predisposition towards the pragmatic rather than the theoretical, which tends to inhibit policy formulation before the event. However, there have been recent indications that in response to the problems and opportunities associated with the accelerating introduction of electronics into information processing and distribution at all levels of society, there may be a more urgent need to develop a body of policy directed towards the full exploitation of information resources, and their increased development as marketable commodities.

The central position in the British information infrastructure is occupied by the British Library, which was established by the British Library Act 1972 as 'a national centre for reference, study and bibliographic and other information services', in science, technology and the humanities. It is controlled by the British Library Board, and is supported by public funds. It is responsible for bibliographic control of domestic literature, for establishing and making available a comprehensive collection of literature and other recorded matter, and for sponsoring research which can contribute to the efficient management of other libraries and information services. Its services include BLAISE, UK MARC, the British Museum Library, the Science Reference Library, the National Sound Archive, the national Newspaper Library and, perhaps best known outside the British Isles, the British Library Lending Division. The British Library has no direct policy-making responsibility other than in relation to the conduct of its own operations, although clearly the nature and extent of its service provision have a considerable effect on the British information environment, and decisions affecting its operations have substantial external effects.

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The public library system, which comprises some 5,600 public libraries, is not centrally controlled, but is the responsibility of the various, local authorities (either County Councils or Metropolitan Boroughs) which are required by the terms of the Public Libraries and Museums Act 1964 to provide the service, and which fund it from the rates (local taxes) and rate support grants. Because it is locally controlled, the details of service provision vary throughout the country from authority to authority, but all public library authorities provide free lending and reference services to members of the public, and book reservation and interlibrary loan usually on a cost-recovery basis. Optional services offered by many authorities include school library support, information services to the public and to local school library support, information services to the public and to local industries, online searches, and loan services for recorded music, videotapes, pictures and software. A charge, usually below cost-recovery level, is generally made for these services.

University libraries are financed by individual universities from the funds made available by the Department of Education and Science through the University Grants Committee (UGC). The allocation of funds to each individual library is at the discretion of the university, and UGC exercises no control, although it has a sub-committee on university libraries. Departmental libraries, of which there are a large number, often professionally staffed, are the responsibility of individual departments, although there is often some liaison between them and the main library over stock acquisition policies. In all there are about 800 academic libraries, including those in colleges of higher and further education, and polytechnics.

Industrial and business libraries, of which there are probably more than a thousand, are funded directly by the organisations of which they are a part, and there is no part of government which has a direct concern with their operation or policy. However, the Department of Trade and Industry is involved in information for industry, in the sense of broad general provision, through some database development support and other mechanisms. There are other special or research libraries, about a thousand in number, in research associations, learned societies, local government, public corporations and so on, and again, their funding and policy is the concern solely of their parent organisations.

The government information responsibility, in addition to those funding involvements noted above, is in the provision of information services to meet its own needs, including the needs of ministers, administrators, inspection and advisory services, and government research establishments. This means that each department of state, such as the Department of Health and Social Security (DHSS) and the Department of the Environment has its own large library, and operates a number of information services as a part of the business of carrying out its administrative functions. In a number of cases, the information services they operate are made available to the public, either through an organised service mechanism such as those for which the Ministry of Agriculture, Fisheries and Food is responsible, through its advisory services to agriculturalists, or in other, less formally organised, ways. Some departments, which create databases for their own purposes, make these databases available for purchase, either in printed forms or by online access.

Each department has some degree of responsibility for the oversight of the information provision in its own sector of interest, which in a number of cases means that grant or other support may be given to an external or private body for the provision of specific publicly-available information services. As an example, the Disabled Living Foundation, a charitable trust, receives grant support from the DHSS for the provision of information services on technical aids for elderly and disabled persons. Apart from some information collections which are defined or made available by statute (such as land or other registers), there is no general obligation for departments to provide or sponsor information services.

The Department of Trade and Industry has always had some interest in the provision of information for industry, but of recent years it has had a greater responsibility in the area of information technology, in discharge of which it has provided support to programmes of education in computer technology and microelectronics, the location of microcomputers in schools, and the development of advanced information technologies, both during 1982 which was designated Information Technology year, and to a lesser extent subsequently. A part of its function is the stimulation of research, development and manufacture of new products and processes in Information Technology. We shall return later to the involvement of this Department.

The Office of Arts and Libraries (OAL), which was formerly a part of the Department of Education and Science but which now comes under the Privy Council, is the responsibility of the Minister for the Arts, and deals with information policy issues which do not fall within a defined departmental interest. Its remit is to encourage the development of library services, including consultation with independent organisations that have responsibilities for public and academic libraries. It is responsible, among other things, for the Interdepartmental Coordinating Committee on Scientific and Technical Information (ICCSTI), a loosely structured body which brings together representatives (usually the librarians) of departments of state, the British Library, some research councils and the Atomic Energy Authority, for discussion of interdepartmental co-operation in information affairs. OAL is served by professional advisers on both library and information services, and has an advisory council, the Library and Information Services Council, made up of distinguished representatives of the library and information professions. It has no funds for the support of external library or information services, or for research other than for its own purposes.

Like every other member state of the European Economic Community (EEC), the United Kingdom sends two delegates to the EEC's Committee on Information and Documentation for Science and Technology (CIDST), the two being senior members of the Department of Trade and Industry and of the Office of Arts and Libraries respectively. British representatives on the sectoral working groups reporting to CIDST are drawn from government departments or laboratories, or occasionally from the British Library. ICCSTI serves as a briefing committee for the CIDST representatives. OAL also provides the national focal point for UNESCO's General Information Programme, and other departments have links as appropriate with the information programmes of other United Nations' (UN) sectoral agencies and programmes, such as the Food and Agriculture Organisation and the UN Environment Programme.

There are a number of non-governmental organisations which have involvements with and effects on the information and library scene in the United Kingdom. These include professional bodies, such as the Library Association, which is the qualifying body for the library professional, and to which all certified librarians belong. The Institute of Information Scientists is also a qualifying body, catering for the information officer as opposed to the librarian, although there is considerable overlap in the membership of the two bodies. Perhaps at this point we should note that, unlike many other countries, the United Kingdom does not stress a distinction between librarians and information officers, and many of those working in business and industrial information departments have library qualifications. Normally a library qualification is a first or primary qualification, whereas an information qualification would be taken as a postgraduate diploma or a higher degree, but this is not a hard-and-fast rule. For information work (but not usually for public library service) the various qualifications are treated as more or less equivalent in value.

Returning to the non-governmental bodies, there is of course our own organisation, Aslib, the Association for Information Management, which, while not a qualifying body offers a wide range of training courses in all aspects of information management. Its membership is predominantly corporate bodies, and its purpose is to promote the development and adoption of good information management practice, and to give a variety of forms of support to practising information managers. Although a British-based organisation, it has members in more than seventy countries, representing public, academic, government and industrial information interests. It has a dozen semi-autonomous special interest groups in various sectors, including chemistry, electronics and economics and business.

The Association of Database Producers represents many of the producers of the United Kingdom's publicly-available online databases, of which there are nearly 120, including *INSPEC, CAB Abstracts* and *Textline*. It is basically a trade association, formed to represent its members' interests to government, and to discuss problems common to its members.

The Society of Archivists' members are, as the name indicates, concerned with the archival storage and treatment of documents and other records. The Society of Indexers is for book indexers primarily, although other classes of indexer are eligible for membership. There are also a number of other local or special-interest societies, like the Circle of State Librarians, but their effect on policy is generally not very strong. One group, not strictly a society or association is the Standing Committee on National and University Libraries (SCONUL), which acts as a coordinating body, and represents the collective interests of its members. Aslib, the Library Association, the Institute of Information Scientists, SCONUL and the Society of Archivists are members of the Joint Consultative Committee, which meets from time to time to discuss matters of common concern, and to make representations to government as necessary.

The Royal Society has an Information Committee which is concerned with the provision of scientific information, in particular with the journal production of the learned societies, which it is able to support to a limited extent. The British Computer Society, not surprisingly, also has a strong information interest and influence. Most learned societies have information or publication committees, which from time to time make their points of view known on various information issues. Their publishing interests collectively are brought together in the Association of Learned and Professional Society Publishers.

In addition to all these bodies, and others representing user groups, such as the UK Online User Group, the Association of British Library and Information Science Schools (ABLISS) reflects the interests of the seventeen library schools. Some seventy courses of one kind or another, leading to qualifications in information science, are available in the United Kingdom, some from institutes of higher or further education which are not included in ABLISS, such as the London Business School.

Standards for documentation are developed and promulgated by the British Standards Institute, which has a Documentation Standards Committee and more than thirty sub-committees concerned with particular subject interests in documentation and with the Universal Decimal Classification.

Together with these bodies, there is a large and complex structure of networks of library co-operation which has often developed from informal beginnings. These networks range from the interlending networks, of which LASER (the London and South-eastern regional network) is an outstanding example, to processing networks for shared cataloguing like BLCMP (Birmingham Libraries Co-operative Mechanisation Project). There are also some special facilities like the former National Reprographic Centre for Documentation, now given a new name and role as the Centre for Information Media and Technology (CIMTECH), and the Primary Communications Research Centre, both research centres supported by the British Library Research and Development Department.

With such a wealth both of resources and of organisations with some degree of oversight responsibility or concern in the field, it is not perhaps surprising that the involvement of government at the policy level has been small. There are many opportunities for exchanges of views and airing of differences between the different interests, and many mechanisms through which the needs and views of the information community can be brought to the attention of the appropriate part of government, although it must be admitted that in the present economic and political climate the likelihood of any response involving increased public expenditure is small.

A recent policy-related initiative was the publication of a Report entitled *Making a business of information*[1] by the Information Technology Advisory Panel. The Panel, whose formation was announced by the Prime Minister in July 1981, comprises the top executives of four IT manufacturing companies, the Director of the Cambridge University Computing Service and the Director of Information Technology of the Post Office. Its area of concern is information *technology,* not information, which means that it usually concerns itself with computerisation, word processing, cable television, satellite broadcasting, and in general the hardware of information transmission. However, after the IT 82 initiative, which was in essence a massive campaign to sensitise British industry to the advantages of microprocessor and other electronic applications, the Panel felt that the uptake of information technology would be stimulated if some efforts were made to promote the development of the *information* which the technology was designed to process. It therefore prepared the Report, calling for more attention to be paid to the I of IT, the organisation and delivery of information in new ways and the creation and maintenance of the commercial value of that information — information very broadly defined to include both what we professionally think of as information, and entertainment and educational products.

The ITAP Report[2] made three very general recommendations, which we quote in full:

> 'i. Government should recognise the current economic significance of the tradeable information sector, and the opportunities for future growth, and take its interests into account in policy formation.
> ii. Those already active in information supply — in publishing, broadcasting, film-making etc — should closely examine their present activities to identify how new technology is eroding previous distinctions between their previous interests and others with which they may previously have had no contact, and should prepare business strategies accordingly.
> iii. Those wishing to stimulate or participate in new business activities should note the many opportunities now being opened up through the use of new technology for the supply and analysis of information, which are suited to an entrepreneurial approach'.

The Panel noted in its more detailed comments that there was a serious lack of detailed statistics about the information industry, defined in the broader sense used in the Report, and that steps should be taken to remedy this, including the encouragement of more academic study of the area, and a revision of the government statistical classification. Copyright legislation, unsurprisingly, was identified as an area requiring immediate action, to take account of current and foreseeable technological developments. A number of comments were made about the undervaluing of information services, and the need to take actions to increase awareness of the value of information both as a prime commodity and as a contributor to industrial development. It was also noted that both government and the information industries are fragmented in their approach to information, and that both sides should take steps to bring their diverse interests together. Perhaps its main contribution was the introduction of the concept of 'tradeable information', meaning information services or products which are potentially saleable, and which according to current thinking should therefore be sold.

The Report was published in September 1983, and the majority of professional organisations concerned in the area published their comments shortly thereafter. The disappointing government response came in July 1984, in the shape of nine and a half A5 pages of largely anodyne agreement in principle, without much commitment in practice[3]. The only actions of much interest to the library and information world are a declared intent to bring forward a comprehensive programme of copyright reform, and the appointment of a minister in the Department of Trade and Industry to have special responsibility for co-ordination of activities concerning the tradeable information sector. This appointment is in addition to, not in place of, any existing ministerial responsibilities such as that of the Minister for the Arts, and is intended to facilitate a greater degree of inter-departmental co-ordination of policies. To date, no effects of this appointment have been perceptible, and the only copyright action has been the introduction of a Private

Member's Bill to clarify the copyright position of computer software. However, at the time of writing we understand that a White Paper should be published in December 1985.

The information industry, on the other hand, took more rapid action, and after a series of meetings formed the Confederation of Information Communication Industries (CICI) in October 1984. This Confederation, whose members are in principle associations and not individual organisations, includes Aslib, the Library Association, the Institute of Information Scientists and the British Library, as well as the Computing Services Association, the Periodical Publishers Association, the Association of Data Processing Managers, the British Videogram Association, The British Phonographic Industry, the Independent Television Companies Association, the British Broadcasting Corporation and others, a total of about thirty members at present. The Publishers Association provides the secretariat. There are working parties, on legal matters, education, market development, technical issues, and public affairs. While it is too early to see any effects from the birth of this new grouping, it is possible that pressure will be generated on government which may result in the development of policies in the interest of the information industries. At the least, the new body should constitute a forum for the exchange of views and the resolution of some problems. It may also help government, in the process, to arrive at a clearer picture of the information world as a whole, and a greater appreciation of its problems, needs and importance to society and the economy. Some recognition of its possible utility is given by the establishment within the Department of Trade and Industry of a small group whose business it is specifically to liaise with CICI. Given that one of the clearer effects of the introduction of electronic processing into information work is a blurring of professional roles, and a breaking-down of the boundaries between various professional groupings – so that, for example, electronic publishing may transfer some of the publisher's distribution functions to the librarian, and some of the librarian's archival functions to the publisher – the bringing together of all the production and distribution industries which collectively represent the creators of intellectual products will inevitably bring about changes in the national infrastructure, and the policies shaping it.

The description of the British infrastructure that we have given you, although little more than an outline, should serve to show that although we do not have a single government focus for information policy in the UK, and therefore have no unified body of policy, there is nevertheless no shortage of bodies which are interested and concerned in the field. Every government body which has any major involvement with information has its advisory bodies, whose membership is drawn from interested external organisations and professions. Each of the professional and other bodies we have mentioned has committees to run its affairs and to develop its policies in relation to issues and problems in the field, and these committees are often made up of members or representatives of the other interested bodies. As an illustration, the last time Aslib published the list of committees on which it was represented, there were seventy-eight committees listed; the number has increased slightly since then, because we are represented on the Board of CICI, and on four of its working parties. In addition, a number of ad hoc committees and working parties are formed from time to time, to discuss or deal with a current problem, or to monitor or advise on the conduct of a research or development project, and these also are made up from interested professionals. In consequence, there is a high degree of awareness of what is happening in the field, and what policies and actions are being discussed or mooted, and there are many opportunities for expressing any particular point of view.

At the beginning we said that the United Kingdom had no concerted body of policy with regard to libraries or to the information field. Nevertheless, there are some principles which are generally accepted, some commonly-voiced attitudes or disquiets, and some new principles, enunciated in response to changing circumstances, which may be in process of acceptance in the library and information world. As an example of the first, most librarians would still defend the principle recently restated by Sir Frederick Dainton, that 'Everyone in a civilised society has a right of access to what is published just as he or she has a right to proclaim his or her own views[4]'. Dainton went on to say, however, that 'Therefore, any financial impediment to access to published material, *over and above the fair cost of producing and publishing it,* is an impediment to the liberty of utterance[5]'. By saying this, he allowed the possibility of costs paid for service given, which is a not an unreasonable point of view, but one not shared by the whole of the library community. Most library services now are obliged by economic necessity to make some charge for services over and above the basic lending and reference services which are by statute made available free of charge, and while the principle of charging for anything at all is still resisted by many, nevertheless the levying of charges is gradually becoming more widely accepted. The principle on which charging is based is that there is a certain level of service which is and must remain free to all, giving the right to read whatever is published, for the purposes of amusement, education or information. Extra services, beyond this fundamental right, should be paid for by levying charges on a cost-recovery basis, with some exceptions being made for those who are unable to pay, such as the elderly, the unemployed, or students.

This viewpoint of course fits in very well with the idea of 'tradeable information' which was put forward by the ITAP report. In the United Kingdom, and in many other countries as well, information and information services have always tended to be undervalued, in the sense that most managers and administrators, in industry and in government, and many academics, have been unwilling to pay the full cost of information service, to make adequate provision in their budgets for information service support, and indeed to recognise the true value of the contribution to research, development and production that is made by good information supply. If the related concepts of 'tradeable information' and of paying a fair price for information services are accepted by the community at large, if it is fully appreciated that information has a *cost,* a *price* and a *value,* then at last we have some hope of seeing our information resources properly funded and properly exploited to our economic and social benefit.

Recognising that access to the information resources of the world, rather than their collection and storage on site, is what matters most, a recent report by the Library and Information Services Council[6] advocated that libraries should turn from a holdings policy to an access policy. This is not a totally novel idea, because the principle of sharing resources has been with us for a long time, but it is novel in being suggested as a deliberate policy to be pursued in planning the future structure of the library system in the UK. As publications become more expensive, and as publicly-funded activities are required to exercise greater economies of operation, the pooling of stock resources in order to free scarce funds for staff and services becomes an increasingly attractive option. It is an option which to be truly effective requires planning at a local, a regional and perhaps a national level, and therefore will, if generally adopted, require the development of stock acquisition and allocation policies. It would, obviously, have to be done in such a way as to do the minimum damage to the revenues of journal and monograph publishers, or it would become self-defeating. How such a policy would operate in an electronic publishing environment has not yet been discussed.

Another policy-related principle which is rapidly being accepted is that with which Aslib is directly associated, that of information management. In the past, librarians and information officers have usually been associated with external information, that is information which is published outside their own organisations. The responsibility for internal information has been exercised by managers, laboratory directors, research staff, computer staff and others. In recent years, the idea that *all* information flowing into, through and from an organisation should, for greater effectiveness, flow through the same channels, whether it is generated internally or externally, has given rise to the recognition of the role of the information manager. It has long been recognised that military operations, to be truly effective, depend crucially on good intelligence, good information about the environment of operations and all the factors likely to influence a given course of action, including not only knowledge about the opposing forces but also knowledge about the state of readiness of one's own. The need for good intelligence in business or industrial operations is now being more generally accepted, and in consequence the need for a director of intelligence is also seen. The 'Director of Intelligence' in an industrial setting is the information manager, who combines or has access to the skills of several disciplines, including library, data processing and communication skills as well as managerial. Recognition of the need for such persons has policy implications in terms of short-term training provision and longer-term educational facilities for the emerging profession, as well as manpower planning implications.

We have briefly mentioned some of the elements of policy-related thinking in the library and information world in the UK. There are other themes developing, although we have not touched on them, which eventually may become part of a national policy, or something as near to a national policy as the British are ever likely to get – you must remember that we have managed for a very long time without a written constitution. The overall position is that we now find ourselves in a time of great change, when economic pressures and a greater range of technological alternatives are forcing the various professions associated with information generation and distribution to rethink their roles and the rationale behind their present services. It is obvious that in a decade or so, the information world will be very greatly changed, but how we should best prepare ourselves to meet these changes is less obvious. For the present, those of us who have some responsibility for meeting the challenge of the future are obliged so to conduct ourselves that we are aware of the emerging possibilities, and are ready to change, but do

Reuters: a survey of end-user searching

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As part of its commitment to new technology Reuters, the international news-gathering agency, is replacing its library of press cuttings' files with a full-text database, Newsbank. *Until the introduction of* Newsbank, *information retrieval from the cuttings' files was carried out by a team of trained librarians; now it is the journalists – the end-users – who are expected to search the database. In order to obtain feedback on the value and use of* Newsbank *a questionnaire was distributed to Reuters' journalists. Results show that* Newsbank, *in its present form, is not a success. Furthermore there is a strong feeling amongst the journalists that information retrieval is not part of their job but should be carried out by trained librarians.*

Aims and objectives

The aim of the research was to obtain end-users' opinions on the usage and value of *Newsbank,* the full-text database produced by Reuters. The results would, it was hoped, enable the database editor to make recommendations concerning its development and its future role as an electronic alternative to the traditional (hard copy) press cuttings library. Despite the small sample (33), the results gained should also interest librarians and others involved in the future of end-user searching.

Background

Reuters is one of the largest international news-gathering agencies. Since the 1970s it has been committed to the implementation of electronic news editing, dissemination and retrieval. It is particularly successful in the field of financial information: as far back as 1973 Reuters realised that fluctuations on foreign exchanges had to be monitored as quickly as possible. The Monitor Video service was established to provide information on the movement of currencies on a 24-hour basis. Today the service also includes commodities, shipping, equities, bonds, gold and oil, and a facility to deal in currencies.

However it is not with financial information that this survey was concerned; the Monitor service merely indicates the degree to which Reuters is involved in electronic information services. Reuters also has journalists based around the world gathering 'hard news' stories, and sending them back to a number of editing centres, including head office in London, where they are edited and distributed to media and other clients around the world. In order to assist the roles of editing and sub-editing the London-based journalists used hard-copy files, consisting of earlier Reuters stories, which were stored in the library. Until the introduction

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of *Newsbank,* the full-text database, it was the librarians' job to search these files, checking facts and providing background information.

Since 1980 the London-based journalists have received copy directly onto the screens at their desks and in 1986 Reuters hope to do away altogether with hard-copy versions of Reuters stories thus creating a paperless office. The library will not contain printed press cuttings but will consist of an electronic database – *Newsbank* – which will replace, indeed already is replacing, the press cuttings' files. The librarian's job, then, is no longer to check facts and answer journalists' enquiries but to maintain *Newsbank,* classifying the stories and designating search fields – by-line, country, dateline etc. Searching *Newsbank* is carried out by end-users, the journalists with the standard library response to queries being 'Have you tried *Newsbank?*' Needless to say the number of librarians has been reduced from seventeen to eight with plans to reduce even further. There is no *Newsbank* thesaurus; subject searching is free text only (keyword).

Reuters journalists also have access to *Nexis* which is situated in the newsroom and is available 24-hours a day. *Nexis* contains the full text of the *Washington Post, New York Times, The Economist* and many other international daily and weekly publications. With its specially designed 'user-friendly' terminal *Nexis* is aimed at end-users, although informal research seems to suggest that in other UK media companies its use is mainly confined to librarians and information specialists.

End-user research

There has been little research so far into the searching habits of end-users of full-text databases, partly because they are a relatively recent phenomenon. In the UK full text has been mainly confined to the law *(Lexis, Eurolex)* and numeric databases containing financial and other statistical information.

However, research into the use of bibliographic databases sheds some light on the problems of end-user searching. A study of engineers at Raytheon, a major US supplier of military sonar systems, was designed to test the hypothesis that end-user searching is more efficient than searching by librarian intermediaries. The results disproved the hypothesis and end-user searching figures were astonishingly low[1]. Another US survey at Exxon oil company concluded that low use by end-users could be attributed to 'the realisation by some end-users that online searching was a difficult and challenging skill, requiring time and effort to master'[2].

Lexis, the full-text database of the law, appears to be successful. Its producers, Mead Data Central, claim to have a trained user base of 200,000 people, and having taken ten years to get 3,500 accounts, doubled that number in one year, 1983[3]. In the UK alone 6,000 lawyers have been trained since 1981.

> 'It is the Lexis philosophy that everything should be done to encourage the lawyer who has the research problem to use the terminal himself . . . the lawyer should operate the keyboard because only he will be fully acquainted with the language and concepts used in the document for which he is searching'[4].

But, when asked, most lawyers admit that they find it easier to delegate the search to the librarian. 'I haven't got time' is the standard response. The time to learn how to search effectively – to construct a search strategy, to log on, and carry out the search. It is quicker to delegate to the retrieval expert.

Nexis, also from Mead Data Central, is aimed at end-users yet the majority of terminals are to be found in libraries and information departments (at *The Economist,* BBC (British Broadcasting Corporation) and ITN (Independent Television News) and used by the intermediary. Why? Partly because managers are reluctant to allow free access to such an expensive 'toy' (it can cost over $100 an hour to search on *Nexis*), and partly because the journalists themselves are reluctant to use it – information retrieval is not their job.

Barry Flynn discussing British journalists and new technology explains:

> 'I sit typing this at a BBC Micro which, at the flick of a switch, can talk to any database in the world whose publisher is prepared to enter into a contract with me . . . I can dial up every story the news agencies send out on their national and international wires . . . I can scan abstracts of virtually any academic and scientific articles I choose, or inspect any edition of Hansard over the past two years . . . So why have British journalists ignored the information retrieval revolution? In part because it is not easy to learn how to search databases if you have no previous computer experience, a process hardly facilitated by the practice of different publishers using different "dialects" for data retrieval'.

So how have end-users at Reuters fared?

Methodology

A questionnaire was devised consisting of ten multiple choice questions plus an open-ended invitation to comment on *Newsbank,* how it could be improved and how it compared with other information-checking services available in Reuters. It was distributed to seventy-five journalists in the main Reuters newsroom working on the World Desk, Features Desk, Commodities Desk and Financial Desk. It was not distributed to those who had just returned from assignment abroad and those involved in duties such as helping to develop Reuters' new video-editing system. Journalists working in London Bureau, Sports Desk and the City Office were also excluded.

Analysis of the structured questions was done using SPSS (Statistical Package for the Social Sciences) on the DEC 10 computer at the Polytechnic of North London. The open-ended questions were analysed manually.

Replies were received one week later from 33 people – 44 per cent of those surveyed. Five others responded verbally by saying that they did not feel in a position to answer the questions as they had no call to use *Newsbank.* Of the 33 who replied, 26 answered the open-ended question with comments ranging from 25 to 300 words. The World Desk proved to be the largest source of replies with 13 responses.

Respondents were asked to name their main duties, to which 13 (39 per cent) replied sub-editor, 9 (27 per cent) filing editor, 4 (12 per cent) copy taster and 2 (6 per cent) reporter. The other respondents said they did a combination of jobs or did not reply. Of those answering 22 (66 per cent) were male and 11 (33 per cent) female.

Results

Multiple choice questions

1. Weekly usage of *Newsbank:* nobody used *Newsbank* ten times or more during an average week. Only 9 per cent used it between five and ten times and 78 per cent said they used it five times or less. Significantly 42 per cent said they never used it (Table 1).
2. Usefulness of *Newsbank:* no one found *Newsbank* 'very useful' and only 15 per cent said it was useful. The remaining 70 per cent who answered found *Newsbank* 'not very useful' or 'not at all useful'.
3. Understanding of *Newsbank:* only 3 per cent (one person) said they understood *Newsbank* fully and 24 per cent said they knew 'enough to use it'. 36 per cent replied 'a little' and 27 per cent said they did not understand it at all (Table 2).
4. Frequency of calling library: 12 per cent called the library five or more times a week and 75 per cent said five times or fewer (Table 3).
5. Quality of library service: this question asked if the library's telephone enquiry service had improved or deteriorated since *Newsbank* was introduced. Nobody said it had improved, 64 per cent said it had deteriorated and 15 per cent said it had not changed (Table 4).
6. *Newsbank* documentation and guidance: nobody described this as 'very useful' and only 3 per cent (one person) as useful. 42 per cent said 'not very useful' and 33 per cent 'not at all useful'.
7. Methods of searching *Newsbank:* of the 42 total replies to this question (some ticked more than one method) 31 per cent said they searched using keywords. Topic code, dateline, country and date were each cited by 2 people (5 per cent) and 7 per cent claimed to use 'two of these' methods.
8. Impact on work: this question asked if, since the introduction of *Newsbank,* journalists were more or less likely to delay filing/processing/writing a story until checking a fact or facts. 12 per cent said more likely, 21 per cent said less likely and 45 per cent said no change.
9. Usage of *Nexis:* 6 per cent said they used Nexis five or more times weekly and 79 per cent five times or less (Table 5).
10. *Nexis* vs *Newsbank:* 3 per cent (one person) claimed that *Newsbank* was easier to find information on while 36 per cent said *Nexis* was easier; 9 per cent said both were the same (Table 6).

TABLE 1. *Weekly usage of* Newsbank.

Number of times used in a week		%
5–10	3	9.1
1–5	12	36.4
Never	14	42.4
Other/Not answered	4	12.1
	33	100.0

TABLE 2. *Understanding of* Newsbank.

How well is Newsbank *understood?*		%
Fully	1	3.0
Enough to use it	8	24.2
A little	12	36.4
Not at all	9	27.3
Not answered	3	9.1
	33	100.0

TABLE 3. *Weekly usage of library service.*

Number of times used in a week		%
More than 10	1	3.0
5–10	3	9.1
1–5	21	63.7
Never	4	12.1
Other/Not answered	4	12.1
	33	100.0

TABLE 4. *Quality of library service.*

Newsbank's *impact on library service*		%
Deteriorated	21	63.6
No change	5	15.2
Other/Not answered	7	21.2
	33	100.0

TABLE 5. *Weekly usage of* Nexis.

Number of times used in a week		%
More than 10	1	3.0
5–10	1	3.0
1–5	16	48.6
Never	10	30.3
Other/Not answered	5	15.1
	33	100.0

TABLE 6. Nexis-Newsbank *comparison.*

Which service is easier to use?		%
Newsbank	1	3.0
Nexis	12	36.4
Both the same	3	9.1
Not applicable	8	24.2
Not answered	9	27.3
	33	100.0

It would seem then that the Reuters' journalists at London Head Office use *Newsbank* rarely, find it less than useful and understand it only a little or not at all. The documentation and guidance provided with the system is thought to be of little help. When *Newsbank* is used, manipulation is crude – few people can exploit its complexities. By a twelve to one ratio, the survey shows that journalists prefer to work with *Nexis* rather than *Newsbank*. In addition there is a strong feeling that the library telephone service – for many years the journalists' primary method of checking facts at Reuters – has deteriorated since *Newsbank* was introduced.

Comments

Three main factors emerge from the open-ended question:

1. lack of training and poor documentation;
2. the feeling that *Newsbank* is cumbersome and complicated;
3. most significantly, the need for the support of a retrieval expert (in other words, a librarian).

It is also time-consuming to use, and the time-lag before stories are available for searching is too great to make its use worthwhile.

Lack of training and poor documentation

Sixteen out of twenty-six who wrote comments mentioned lack of training and inadequate documentation. Comments included:

- 'more systematic training would be useful';
- 'I've never been educated in the use of *Newsbank*';
- 'I do not use *Newsbank* because I cannot for the life of me understand how it works'.

On the material that has been provided, one sub-editor wrote: 'The User Guide needs a total re-write. Any document that contains the sentence "Your searches can be constructed according to Boolean Logic" is written to satisfy the ego of the writer, not the needs of the user'.

Newsbank *is cumbersome and complicated and compares badly with* Nexis

- '*Nexis* I find perfectly simple; surely Reuters can come up with something we poor hacks can use';
- 'time consuming, very hard to use, erratic, frustrating, inconsistent . . . I only use it as a last resort';
- 'not sufficiently user friendly . . . should always use simple English and should guide the user';
- 'seldom delivers the right goods in time to be useful; usually end up fudging or cutting the point of query; *Newsbank* is also limited in its scope and not up to date;
- 'the lack of historical data, beyond six months back, and the absence of non-Reuters copy, means it cannot compare with a proper library';
- 'before *Newsbank* the library had information up to two days ago; now it's ten days'.

Need for library support
Perhaps the most revealing comments, and certainly the ones of most significance for the library and information world, are those concerning the lack of human support which has been the inevitable result of the introduction of *Newsbank.* The comments from the journalists, the end-users, speak for themselves:

- 'We need a full time librarian/information retrieval person on the Desk to sort out queries and produce the answers for us'.
- 'Reuters owes its new profitability to the timely introduction of high tech in gathering and distribution of information, but when it comes to checking the machine is often inferior to human back-up. To retain our high standards of accuracy, I believe we should retain a good, helpful friendly staff of librarians and World Desk assistants. For journalists to spend ages trying to extract background (information) from machines is a waste of the time we could use for more and better sub-editing'.
- 'The fact that journalists have to waste valuable editing time doing a librarian's job means more stress or a worse job or both . . . To have librarians tell us that we must access information from a tool we have not been taught to use – and when we are in a hurry to put out an important story – is infuriating. Reuters should have human back-up for checking facts so that journalists may concentrate on writing and presentation . . . what happens when all of the library is thrown away and *Newsbank* goes down?'
- 'Library seems to think we should now do all the information checking'.
- 'Feel librarians should always be there to help subs in a hurry'.
- 'In the old days one could ring the library with a query and get on with subbing/writing the story while awaiting a reply. Now we have to spend anything between five and thirty minutes on trying to get an answer from *Newsbank,* and then still have to go back and start subbing the story . . . why not install a fully qualified librarian on the fourth floor to operate the machine?'
- 'Handier to be able to telephone the library and continue subbing a story while someone searches for the information required, rather than holding up the process by searching oneself'.
- 'have someone available to answer questions so people will be more inclined to use it'.
- 'The library service has effectively collapsed . . . the introduction of *Newsbank* is a giant step backwards'.

Conclusion

Virtually no one has a good word to say about *Newsbank.* Even those with sympathy, or who regard its advent as inevitable, feel it is difficult and clumsy to use. A number see the concept of a journalist-used – i.e. end-user – database as a waste of time, taking the journalist away from the main professional functions of writing or sub-editing. The deterioration of the library service appears to have caused bitterness. This is hardly surprising: it can be very frustrating, having wrestled unsuccessfully with *Newsbank*, to ring the library and be immediately advised to look in *Newsbank*. The need for sympathetic and knowledgeable human assistance in checking facts was widely stressed. Journalists do not consider it is their job to spend precious time checking facts when they could be writing or sub-editing. Some journalists complained that standards are dropping as they leave facts unchecked rather than wrestle with *Newsbank*.

This small survey dealt with *Newsbank* at a very basic level – crudely 'Can you use it? Do you use it?' If it had been attempted at any deeper level, the answers would probably have shown an even more alarming level of ignorance and confusion. End-user searching at Reuters has so far not proved successful. If ever a case need to be made for the continuation of the librarian as intermediary then Reuters seems to provide the evidence.

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An information service for small firms from a public library base

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Introduction

Small firms have been attracting increasing attention in recent years. An awareness of their potential contribution to an ailing economy has given rise to a multitude of assistance schemes and benefits. Financial organisations, government departments and other interested parties are all trying to assist start-ups and the development of new enterprises. Local authorities, too, are becoming aware of the role they can play.

The British Library (BL) has been supporting research in the area for some time[1]. In 1982 Capital Planning Information (CPI) completed their report on information and the small manufacturing firm[2], based on an investigation of the provision and use of information for small firms, in four different geographical areas. It revealed that public library resources are generally not known to industry and are markedly under-utilised. As a result of one of the report's recommendations, the Suffolk study of information services to small firms by the public library was undertaken.

Situation in Suffolk

During the late 1960s and the mid 1970s new employers, both large and small, moved into Suffolk. Ipswich and the expanding towns of West Suffolk were particularly favoured. Nearly half of Suffolk industry is involved in the service sectors, and mechanical engineering is the predominant manufacturing activity. The firms are spread country-wide and although concentration is to be found in the main towns such as Ipswich, Bury St. Edmunds and Lowestoft, small pockets of industry are to be found even in the smallest rural settlements. The County also has the prosperous dock areas at Ipswich and Felixstowe which have expanded considerably with Britain's entry into the Common Market.

Suffolk County Information and Library Service (SCILS) has forty-two service points; the libraries are divided into three main areas, Ipswich, Bury St Edmunds and Lowestoft. The County resources of business and commercial information are concentrated on these main libraries, with Ipswich holding the widest range of current trade directories and the most

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comprehensive business information collection. Of the checklist included in the Liverpool study[3], SCILS holds 50 per cent of the titles. The technical collection of the County is housed at the Suffolk College of Higher Education Library in Ipswich and is amalgamated with the college stock. Subscription to a variety of online hosts enables SCILS staff to access international information as well, through a wide range of databases.

The collection of business information has been amassed over the last 5-10 years. Whilst it is clear that some business people use the library resources both in person and by telephone, there is a general lack of awareness by the local industrial community as a whole of the range of resources that are available to them. Staff resources have been such that there has been no opportunity actively to promote and market these facilities. Up to now the service has therefore been a passive one, of benefit only to those who either know from experience or have heard by word of mouth that such resources exist.

In 1982, discussions began between SCILS and BL, culminating in a research proposal which was approved for support in 1983. The purpose of the project, running from February 1984 to February 1986, was to explore the information needs of small firms (employing up to 100 employees), and to test the relevance of one public library authority's information services to industry and commerce. It was also to test the relevance of BL services to industry and provide information on the role of the public library as an agent for BL services in non-metropolitan and mainly rural areas.

Research methodology

The brief stipulated that a sample of firms should be selected, to include manufacturing and service industries, based in Ipswich and elsewhere in the County. A list was compiled, divided by the relevant parameters of size and product, from general trade directories but more specifically from the proofs of the Suffolk County Planning Department's trade directory (in preparation). Batches of letters were sent out to the managing directors and these were then followed up by telephone calls. (Only 28 per cent responded of their own accord before follow-up.) Interviews were arranged with those that were willing to see the Research Officer, who visited 100 firms during the course of the research. By the end of April 1985, a sample of forty-three firms which were willing to participate in the project had been recruited. They had been told of the range of services that were available to them and on the strength of that and their own interpretation of how they might need to use the service, they were included.

Once part of the sample, the participating firms were able to contact the Research Officer directly for any information they needed. It was found that business people generally distrust public information services at first, believing them to be unable to cope with enquiries of a technical nature or to answer with necessary accuracy and within the time period required. They generally lack the time to explain their information requirements in precise detail to a stranger. To be able to contact someone who has knowledge of their products, and of how they operate, is a definite advantage. They also commonly believe that they have to visit the library to acquire information. Few seem to realise that the library facilities are at the end of the telephone in the same way that their trade association and informal contacts are. These latter sources are very important to small business people. They are more likely, of their own volition, to contact a known source which is unrelated to their specific problem, than to try to locate a correct source which is unknown to them. Many are highly informed as to the manufacturing processes of their product, but find themselves in an unknown world of marketing, financial control and exporting. Many directors of small firms have multiple roles; sometimes only one person is the senior management team, and thus has to deal with every aspect of running a business. They therefore appreciate a member of the library staff visiting them and are more inclined to use the service having established the contact, especially if, over time, trust and credibility develop.

Results

Over the period from June 1984 to July 1985, 350 enquiries were received from the sample firms. The rate of enquiries has been steady, showing the obvious seasonal peaks and troughs, but maintaining on average thirty-five enquiries a month. The greatest number of enquiries received from one firm during this period was forty. (They joined the sample in November 1984.) Every contact with the firms has been recorded; the nature of their enquiries, the sources used to reply and the length of time taken.

Types of information requested

Initially enquiries were only generated at visits, but as time passed and confidence grew more firms telephoned with their enquiries. The most requested type of information (25 per cent) is technical. This includes a range of enquiries from straightforward requests for specific *British Standards* to more detailed enquiries relating to methods of production, such as, for example, the effects of methyl bromide residue on foods. Some companies which are members of active trade associations can often acquire such information from specialist organisations and are not dissuaded from doing so. However, many are not members of trade organisations, for a variety of reasons, and therefore appreciate a local source of information. With the use of online facilities, fairly complex enquiries can be answered by literature searches and subsequent loans from BL Lending Division (BLLD).

Marketing information is another popular area (24 per cent) for requests. This category does not include specific market research (7 per cent) although the dividing line is sometimes very thin. Firms producing new products, or updating market strategies, need lists of manufacturers within defined classified or geographical areas. They may require titles of trade journals covering a particular area or readership, for the purposes of advertising or submitting editorials. Some enquiries relating to the market value of a product, or trends in sales, can also be answered through the use of government statistics.

The third category of information most sought after relates to companies. Fourteen per cent of enquiries relate to financial information on specific companies. With SCILS subscription to ICC Viewdata, for companies on the database, basic financial information can be provided on request at a cost less than that charged by banks and other credit companies. Often the information provided is adequate for the firm's purposes and can be supplied much more quickly than by, for example, approaching the Companies Registration Office.

Sources

The principal sources of information to answer enquiries have been:

Suffolk County sources:	75 per cent
British Library:	13 per cent
External sources e.g. research organisations:	11 per cent
Others:	1 per cent

Invaluable back-up has been received from BL. Sixty-eight enquiries have needed the service of both BLLD and the Science Reference Library (SRL). The individual requests to BLLD have numbered 157. Although predominantly for journal articles, thirty requests have related to market research reports. Fifty per cent of the unsatisfied loans have been connected with this category of request, an area which continues to be a problem.

The SRL has been approached on twenty-four occasions, mainly to use the back-up resources of the Business Information Service (BIS). In the majority of cases the nature of the enquiry required the use either of the wider selection of trade directories available, or of more specialised overseas sources. The BIS directory of market research[4] has been an invaluable tool, especially in its new revised edition and the addition of a cross reference check with BLLD sources is a most welcome extra.

The external sources of information used include government departments, specialist libraries, trade organisations and foreign embassies or commercial attachés. Other sources contacted have been the regional Small Firms Service and local district Employment Development Officers.

All but nineteen enquiries have been satisfied by using the above sources. Thirty-seven per cent have taken less than ten minutes; 9 per cent have taken over two hours. A deadline for a request is established at the time of the enquiry and is met if humanly possible; otherwise, steps are taken to alert the enquirers and provide them with alternative sources from which the required information may be available.

The small firms' reaction
A requirement of the project was that an assessment of the impact of the service, and of the small firms' reactions to the service, would be made by a researcher not otherwise involved in the project. In order to do this, structured interviews were carried out with twenty-two of the firms involved, selected solely on the basis of their availability for interview during the first week in September 1985. The interviews were designed to explore six main areas which were, broadly, the image and usefulness of the public library, the usefulness and impact of the experimental service, its perceived value in cash terms, the relation of the service to other means of information gathering used by the sample firms, changes in information awareness and present uses of information technology. Fuller details of the interview results will be available in the Final Report of the project[5], and only the impact and perceived value are discussed here.

From the interviews it was ascertained that previous use of public library services had been low, and the firms did not have particularly high expectations when they had agreed to take part in the project. The general reaction after using the service was a combination of pleasure and surprise; they were pleased with the speed, accuracy and quantity of the information with which they were supplied in response to their enquiries, and surprised that the public service was capable of such a high quality response. A number of general benefits had resulted from use of the service, including savings of time (specifically mentioned by nine interviewees), savings of money (mentioned specifically by seven) and in most cases, a degree of reassurance or a feeling of security in the knowledge that such a service was available to them. A number of specific benefits were also identified.

In one case, as a result of getting information about a particular process, a manufacturer bought a new piece of plant from the use of which he expected to make a satisfactory profit. In another case, information used as input to a design study resulted in energy savings and was instrumental in choosing the right material for a design. In a third case, a firm needed information on the prior art, technical problems and market for a major invention which it had developed. The service helped with all these aspects, and its contribution was reported as 'substantial, and when the invention is launched the contribution may prove to have been very significant'. In four cases, information obtained from the service made the difference between getting or not getting a contract, or a new client. In another case, a firm's own effort was halved by the supply of information, allowing a particular project to be brought to fruition six months ahead of time. The service helped another firm to find a new material which it can profitably use in its own products. One firm, in the public relations and advertising sector, uses the service to inform itself about its clients and their business interests, and is able to sell the information it obtains by incorporating it in reports to clients. In several cases, lists of potential customers or manufacturers which the service has been able to produce have been used to find new customers and new suppliers. New insights, new opportunities, and a greater image of efficiency in clients' eyes were also mentioned as specific benefits.

It was clear that for the majority of the firms interviewed, the service had had considerable effect, and was valued by its users. One aspect very strongly emphasised by the users was its personal nature, in the sense of its provision by a known and identifiable person within the library. This factor was important for two reasons. The first was that the service had been marketed to the user firms in a very positive way, by personal letters and visits by the research officer, much as good sales people promote their products. The initial visits had given the opportunity to develop an acquaintance with the individual firms' business and commercial interests, which later proved to be of value in dealing with their enquiries. The second reason for valuing the personal characteristics of the service was that users were reassured that their enquiries would be handled, and their telephone calls answered, by a person whose sole job was to service their enquiries, and whom they knew had some knowledge of their individual firms.

During the interviews, the cash value which the participants attached to the service was explored, in terms of what would be considered to be a reasonable price to pay for it if it were a commercial service. Overall, there was a surprising degree of commercial realism in the responses. Not surprisingly, many respondents would prefer to have such service available free of charge, as some return for the rates they pay, but the majority were clearly willing to pay if they could not get such service otherwise. If it were a commercial service, the majority felt that a payment level of the order of £500 a year would not be excessive, dependent on the level of usage. The general view was that a basic subscription of between one and two hundred pounds a year would be acceptable to most firms, and a sliding scale charge for enquiries, related to complexity, of up to around a hundred and fifty pounds for the most difficult. If the object of the study had been to discover whether or not a positive information service for small industry, based on the public library, could be commercially viable, the answer was that, given adequate promotion and a personal level of service, it clearly could be.

The future

When contemplating the provision of a service of this kind, there are a number of options available:

1. To provide no special service for industrial users. They remain the same as any other user group, personally exploiting the stock by visiting the library themselves, or telephoning requests to the relevant library department.
2. To provide a special service for industrial users of the type operated in the project by, for example, providing a 'hotline' to a dedicated professional member of staff qualified to deal with industrial enquiries, with the costs to be met by the existing library budget.

3. The same as 2, but on a part-commercial basis by charging companies a subscription for access to a specialised service.
4. To set up a wholly commercial arrangement, whereby the library authority contracts out the provision of an industrial information service to a qualified freelance information consultant, who acts as agent or licensee for that authority.

The first option is obviously not to be recommended for reasons already indicated. The second is often difficult in these days of economic recession when staff cuts rather than staff expansion are more the order of the day. This leaves options 3 and 4. Indications are that companies are prepared to pay for information of commercial value to them, provided the service is designed to cater for their needs. The third option gives the authority control over the service, but with the burden of maintaining sufficient staff levels to provide specialised facilities. The fourth relieves the authority of direct responsibility, allows them free promotion amongst the industrial community, but also denies direct control over the agent, depending on the nature of the arrangement.

SCILS had originally intended to bring the service 'in-house' if the results of the research indicated that such a service was of sufficient value to the potential users. Suffolk is traditionally a low-spending authority, and it became apparent that existing budgets would not allow for the service to be provided at a suitable level. Consequently SCILS has decided on Option 4 for a trial period, at the end of which it will either renew the license or make arrangements to provide for the added expenditure within the budget.

Such a solution is both economically and politically attractive. No potential user who is unwilling to pay for service is deprived of any rights of access to information that he or she already enjoys, no additional costs accrue to the authority, stock and services already provided for the public are more fully exploited for the economic benefit of the community, and those who are desirous of an enhanced, personalised and speedy information service can have it at a reasonable price. The indications are that, once a service of this kind is established, one information officer can look after the needs of between sixty and eighty small businesses in a local area. At a conservative estimate, there are probably 50,000 small firms in the country, to at least half of which such a service would be relevant and useful. This suggests there may be opportunities for about 350 small-business information officers, if other authorities adopt a similar approach to that pioneered in Suffolk.

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Business information needs in Scotland

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Paper presented to the joint conference organised by the Library Association: Reference, Special and Information Section (Scottish Group) and Aslib (Scottish Branch) on Business Information: Problems and Prospects, Glasgow, Scotland, 17 April 1985.

Introduction

All businesses regardless of their size and sphere of activity require information in order to exist, to compete and to survive. In business planning and marketing, the need for factual and up-to-date information has never been greater and the consequences of ill-informed decision-making can be disastrous. I have been asked to consider what libraries are doing to meet these needs for business information.

Since the late 1970s, business information has become a very topical subject for Library Association conferences[1], and several papers in particular have concentrated on the difficulties of obtaining business information in the provinces. They all seemed to be painting a fairly black picture of the availability of business information the further removed you were from London, but I was not convinced that Scotland had little to offer in the way of business information. I felt sure that there did exist important information sources which were not being fully exploited – through lack of publicity, poor communication, or even lack of awareness by potential users – whether they were business people or librarians.

Background

It seems rather ironic that we should be discussing whether or not business information needs are being met here in Glasgow. The history of municipal commercial libraries in the UK begins right here in Glasgow with the forming of the Commercial Library in 1916. Pitt, the then City Librarian, at its opening spelled out the purpose of the library very quickly and simply as being 'to collect information useful in every kind of business and to make it quickly available'. The needs of local industry therefore were acknowledged and efforts were being made to fulfil them seventy years ago. Furthermore, Glasgow is not the only Scottish city to have a commercial library, since Dundonians, envious of Glasgow, established Scotland's second commercial library in 1919. This was recently given a new lease of life with the opening in 1978 of the new central library in Wellgate.

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Edinburgh's venture into the field of separate commercial libraries began in 1932, but lasted only twenty-six years. However, its city reference library does contain a sizeable stock of business information. It was not until 1938 that Aberdeen formed its commercial library; the discovery of oil and gas and the subsequent development of Aberdeen into the 'oil capital of the North' have undoubtedly aided the development of the library.

What a sad day it was for the City of Glasgow on 4 November 1983 when the Commercial Library as a separate identifiable department was closed down and its stock dispersed to the different departments in the Mitchell Library (Glasgow's Public Reference Library). The city fathers closed the library, if I may quote the *Glasgow Herald*, 'as part of a cost-cutting exercise'. No-one really made any great fuss about this closure; perhaps this was an indication of the fact that the Commercial Library had made little impression on business in the city in recent years, and that many local firms were in fact unaware of its existence and of its potential to provide them with information. It could be argued that Glasgow is simply following the apparent trend in Scotland's other cities and bringing commercial and technical material closer together. But this does appear to be contrary to the trend south of the border where the commercial libraries in Manchester, Sheffield and Liverpool are as strong and effective as ever, and Newcastle as recently as 1982 established its own separate Business Library. The benefits to be accrued from Glasgow's Commercial Library appear to have been lost somewhere.

Survey

In 1982 I set out to find exactly what was available in Scottish libraries in the field of business information[2]. A daunting task, you may say, but I was continually finding myself wanting to know who stocked a particular source book. The Strathclyde Business School's Library is small, and as published sources of business information are very expensive, it is both impossible and impracticable for the Library to buy things that it might only wish to consult occasionally. I found that I could identify with relative ease the source which might provide the information I was looking for – but it was frustrating to be unable to progress any further – did anyone locally stock this directory? It is just as infuriating to telephone the British Library's Business Information Service and be unable to get through – or to have the call answered by the City Business Library in London, only to be told that as you're not a local ratepayer, it cannot help – try your local library! Business people do not want to be told that a particular directory will give them the information – they want information and if the library cannot supply it, they will go elsewhere.

To produce a definitive picture of the depth of Scottish libraries' holdings of business information sources, I put together a checklist of 207 sources of information (see Appendix). Scotland is a relatively small country and rather than look at only the public library provision of business information, I also included the university and college of technology libraries in my investigations.

This checklist was split into seven categories into which the majority of business information problems fall: company information, both in the UK and also overseas; marketing information; product and industry information; statistics and forecasts; financial press; and a miscellaneous section which included such sources as telephone directories, timetables and personnel directories. This list is not, and does not attempt to be a definitive list of sources for every commercial collection, but rather it is a checklist of selected business reference sources which are readily accepted as core material by business librarians.

In all, the stocks of eighteen libraries were checked against this list: the four city commercial collections; seven university libraries; six colleges of technology and the library of the Scottish Development Agency.

Results

Of the 207 titles I checked for, only nineteen were not to be found in any library visited. These nineteen sources included such titles as the McCarthy Card Services for North America and Europe, the *Funk & Scott Index of Corporations, Total Market Sizes, Executive Remuneration* and the *Wall Street Journal.* These all tended to be very expensive and only high demand can justify their purchase. However, it must also be borne in mind that even though two thirds of the titles checked for are to be found in Scotland, the currency of these titles cannot always be guaranteed. Let me illustrate this with a couple of examples: thirty-four sources of UK company information were checked for and the number of titles in each of the city reference collections can be seen from Table 1. However a different picture emerges when the number of current editions which are always bought is looked at. For marketing information, twenty-one sources were checked for; the number of titles held in each library, and again the number of current editions bought (see Table 2).

TABLE 1. *UK company sources in city commercial collections.*

	Total	*Current editions*
Aberdeen	24	17
Dundee	12	7
Edinburgh	21	19
Glasgow	27	25

Total sources checked for = 34.

Glasgow's commercial collection was found to stock the largest number of business sources on my list, but is closely followed by Aberdeen particularly with regard to the number of current editions (see Table 3).

TABLE 2. *Marketing information sources in city commercial collections.*

	Total	*Current editions*
Aberdeen	11	9
Dundee	3	2
Edinburgh	7	7
Glasgow	13	7

Total sources checked for = 21.

TABLE 3. *Business information sources in city comercial collections.*

	Total	*Current editions*
Aberdeen	134	121
Dundee	81	52
Edinburgh	107	95
Glasgow	150	126

Total possible sources = 207.

All I have done here is give lists of numbers and these have all been related to the city commercial collections. These however do give some idea of where information is available in Scotland.

Much of the information required by business cannot be found in book form. Therefore in my travels round Scotland, I also attempted to identify any special information services and files which libraries might have set up to help with the tracing of difficult information problems.

Looking first at the area of company information, there are substantial collections of company annual reports and accounts held at Dundee College of Technology, Napier College, the Scottish Development Agency (SDA) and Strathclyde Business School. Tracing information about small businesses will always be difficult, but to help alleviate this, Glasgow Commercial Library began an *Index of Scottish registered companies* in 1971, which is currently kept up to date using *Oswald's weekly list of new Scottish companies*. The Commercial Library in Aberdeen maintains an index of companies in Aberdeen compiled from local directories and supplemented by a cuttings file of articles; several other authorities maintain useful fact files and industrial indexes.

Market research reports present a constant source of difficulty for business libraries as they are difficult to identify, expensive to obtain, almost unobtainable through the British Library Lending Division and their information content can have a very limited life. There are three libraries which are worth mentioning in this area – the Scottish Development Agency, Napier College and Strathclyde Business School. The SDA purchases reports covering the key sectors of its interests, and it is the only Scottish library found to subscribe to any of the Predicasts hard-copy marketing services – the Predibriefs. Napier College has the complete set of Manchester Business School's Centre for Business Research consumer marketing reports, while Strathclyde Business School holds the complete set of Jordan industrial surveys. On the whole, specific market research reports are more likely to be found in college and university libraries than in the public library sector.

Additional factors

One important point which I should also mention, is that only hard-copy sources were checked for. Increasingly, many business information sources are becoming accessible via online searching, and only one library included in this particular survey did not have access to online facilities. Librarians today have the choice of whether to subscribe occasionally to an expensive hard-copy source or to access online when requiring a far more up-to-date source. Undoubtedly, this is improving prospects of making business information equally available to all regardless of geographical location. However, until fairly recently, information available online has been predominantly American and therefore of restricted use to many in the UK. In a field where information is always required quickly, online access has an enormous potential for business people – not least in that today's library can provide access to much more data than is currently sitting on its shelves.

One other important point which I should like to stress is that an effective business information service depends as much on the abilities of the staff as on the stock provided.

In all the public library authorities in Scotland there is a great awareness of the needs of industry, and in some cases, considerable efforts are being made to satisfy and respond to these needs. However, outwith the cities, authorities do not have many staff or resources to devote to the provision of business information, which is hardly surprising as they cover vastly differing areas – some densely populated, others predominantly rural communities. This varying amount of resources has resulted in a fragmented and muddled approach to the provision of business information, and there is consequently much duplication of material and little depth in the current provision.

Co-operative schemes

In the 1950s and 1960s local co-operative schemes were seen as a method of extending a library's resources to cope with the demands of industry which frequently required highly-specialised information from expensive resources. Across the UK as a whole numerous schemes have developed to serve the needs of local industry, and although the basis of these co-operative schemes varies considerably, they usually all link the resources of the public, college, university and industrial libraries in a particular area, and are extremely valuable in increasing the awareness of the industrial community to resources which are available locally. There are currently thirty local co-operative schemes in the UK, but only two operate north of the border – ANSLICS (Aberdeen and North Scotland Library and Information Cooperative Service) and BECTIS (Bell College technical information service). Although both schemes aim to provide an information service to industry in their respective areas, from talking to the staff involved, it emerged that their primary role is seen as the lending of material; little was also being done to promote and publicise the existence of either scheme. These findings have been borne out by the recent Capital Planning Information report on local library co-operatives[3]. Loaning material and the provision of photocopies were the most frequently-used services offered by the co-operatives. Their report was also highly critical of the promotional literature designed to attract industry into membership. In 1983 ANSLICS appointed a full-time permanent secretary to co-ordinate and promote the activities of the service. Membership in the years from 1980 to 1983 increased by over 400 per cent and successful seminars are being run, but much more needs to be done in this area. In a country as small as Scotland and far removed from the resources of the many London libraries, there is a need for real and effective co-operation on a national scale. Modern methods of communication and the speed with which information can now be transmitted should be developed throughout the library service in Scotland at a local level to enable anyone seeking information on whatever subject to obtain it with the minimum of delay. Furthermore there is a need to ensure that the availability of information is perceived by those who need it.

Scotland has a considerable wealth of business information – but it is unfortunately scattered across the country. Information may therefore be available in Scotland if you know where to find it. Business information provision has developed primarily in response to local needs and demands, and this can particularly be seen in respect to the excellent collection of material on the oil and gas industry built up by Aberdeen.

Improving the library's image

Generally speaking, business information is concentrated on the city collections, but they also rely on the university and college libraries, without whose stocks of business information we would be very much the poorer. Owing to the widely-scattered nature of material in Scotland, it is not surprising that librarians and business people get frustrated when attempting to find business information. Compared to the City of London, there is unlikely to be another library with a substantial collection of business material a bus journey away. Business information may be available in Scotland, but it is fragmented, unco-ordinated, poorly publicised and thus relatively unknown to those who need it. It is apparent that Scottish librarians are becoming increasingly aware of industry and the potential of the library to help provide for at least some of its information needs, and in some areas considerable efforts are being made to satisfy and respond to these needs. Nevertheless there seems to be a great reluctance to move forward and to be more dynamic in this area because of a fear that the library will be unable to provide the level of service which industry might expect. Executives who have been transferred from a London office to a Scottish branch office should not be led to believe that they can find on the shelves in their local library the resources which were available to them in London. Because of the varying sizes of library authorities across Scotland, it is hardly surprising that resources and staff for business information are not available in equal proportions. But somehow we must help to provide them with the information they require; it is desirable that the library should be thought of as the place to go for business information.

Libraries are seen by many as storehouses for books, but books are frequently not equated with information, and subsequently, libraries are not seen by all as the place to go to for information. Moreover, the library is not seen as a possible source of business information. The Member of Parliament, Keith Hampson, summed this up recently by saying, 'the library service is still seen by many to be a frill, not an important instrument of public information'[4]. The library needs to shake off this image and present itself as a reliable first point of contact by making the information at its disposal available to all quickly and efficiently.

Individual librarians could argue that they do not have the resources available to provide an on-demand information service, although if the library is already buying expensive source material, then it is almost criminal not to exploit this fully. Local business contributes to the library service by means of the heavy rate bills it frequently has to pay. Furthermore, anything which assists industry should eventually benefit the locality as well, through the employment and commercial activity brought to the area. A new firm will rarely have the space, personnel or experience to provide its own information service, but unless it is located in a special development area, it will still pay rates. It seems, therefore, reasonable to expect that firms should be able to receive some sort of return on their money through the public library service.

Business information is not just a valuable asset to a company, since many people in all walks of life require access to it. Considerable interest is currently being paid to information for trade unionists; they may require information on a work related problem, health and safety regulations, comparative rates of pay or details of competitors – this is all business information. Similarly, a large percentage of business information in a library is an important source for the job hunter; interview preparation involves finding out as much as possible about a potential employer. People considering setting up their own companies have numerous information problems – where can finance be obtained, what is the local market for a certain product? It is also important to bear in mind the ordinary person who may frequently have recourse to business directories – the headquarters address of a retailer, where can I buy . . .? Constant attention must be paid to the library's potential to help with a business information problem to remind and inform people, otherwise the library will be overlooked as a source of information.

Conclusions

I would like to suggest several ways in which we could improve the availability of business information in Scotland and thereby respond better to the needs of industry. What perhaps we need initially is to revolutionise our way of thinking. We need real and effective co-operation. The acquisition of expensive business sources should be publicised both locally and across Scotland for other potential users. Consideration should also be given to the co-operative purchase of acquisitions. This could result in the plugging of gaps. Rather than have two or three libraries sharing the cost of certain sources, which could lead to possible money and location difficulties, the continual purchase of a directory by one library could give another the resources to purchase a directory which otherwise would not be available in Scotland. Much of the business information sought is for fairly specific facts which can easily be transmitted across a telephone wire so this system would be easy to work.

There is also an urgent need for the business librarians in Scotland to meet regularly, whether they be from local authorities, industrial libraries or higher educational libraries. In this way, librarians could keep abreast of new additions, discuss common problems and generally get to know one another. Our own Reference, Special & Information Section has a working party on business information, but there is no-one from Scotland in it. Because Scotland is a small country real and effective co-operation along these lines is not only desirable, but should also be very possible. A strengthening of existing informal co-operative efforts can only lead to better information for the whole business community.

The public library service is freely available to all. It is therefore in the ideal position to perform a co-ordinating function. No library should duplicate the expertise and special competence of other bodies, but it does have a valuable function in providing guidance as to the existence and location of such specialised information sources. Before the public library can act in any sort of co-ordinating/signposting role, librarians need to get out of the library and discover exactly what there is in existence locally. A local databank of information should be compiled from this, thereby placing the public library firmly in the position of guiding business people to the correct information source. Research has shown that firms will use sources which are familiar and localised, and everyone should ultimately benefit from such a databank[5].

There is a widely-held belief that companies will not pay for information, but industry will pay for information and pay handsomely, as can be borne out by the number of information consultants in existence and also the increased growth in the number of online business databases. Business people will not pay because of some generalised notion that being well-informed is 'a good thing', but will do so because information in a business context facilitates the maximisation of opportunity and the minimisation of risk.

Several public libraries in America have recognised that business users require a level of service in excess of that which normally is provided and they have therefore developed special services for which firms are charged, in order that the library can recoup the cost of the additional resources required. This still maintains the basic concept of the free library service. It is a specially-created service for a select interest group. In a sense, the basics for this already exist in this country. University and college libraries make their services available to industry and commerce on the basis of a fee. A membership charge is also payable to join a local co-operative venture. The main conclusion of the Cabinet Office's Information Technology Advisory Panel report *Making a business of information* was that 'both private and public sectors in the UK need to pay more attention to information as a commercial commodity'[6].

If a realistic response to the needs of industry is to be offered, then we need to move away from the premise that all users of the public library service are equal. The demands made on the public library can be so varied and so many, that in seeking to meet all of them, it has spread its resources so widely that it is really succeeding in satisfying very few in any real depth. If industry will pay for information, then let us really provide the service it requires, otherwise someone else will step in to fill the gap. In 1981 the Swansea Centre for Trade and Industry set up its own information service for local industry completely outwith the public library service. This service is therefore in direct competition with the public library in this area.

The library service must also market its service for industry. Many business people do not realise that the library can provide them with information which might help them in the day to day running of their firm. Capital Planning Information's report *Information and the small manufacturing firm* describes the public library as 'the most obvious example of an under used resource'[7]. However small your library may be, it can still provide access to a wide range of information required by firms. Many of us are guilty of spending more time building up our stocks than actually telling people what our libraries can do for them.

Some advertising and publicity methods are being followed by Scottish libraries, but not really very seriously or continuously. There is an undoubted market for a library service for industry. There are 43,000 registered companies in Scotland alone. Because most business people do not realise that the library can help them, we have to plug and keep plugging our service. It is up to us as librarians to convert business people and go out to companies and discover what the library can do to help. Visiting every firm in the locality would be the ideal, but this is not really very practical, librarians however should be prepared to attend Chamber of Commerce meetings, British Institute of Management meetings, small business clubs, offer to speak at meetings and generally be seen as a useful person for business people to know. Scotland's biggest difficulty in respect of tracing business information is that if one library's resources prove inadequate to answer an enquiry, it is unlikely that another library in the locality will be able to assist. There does appear to be a need in Scotland for a Scottish business information resource – a one-stop enquiry point to lead the enquirer either directly to the information required or to the right source of help and information. The establishment by the British Library of a Business Information Service in the Science Reference Library has not really helped librarians or business people in Scotland. In April 1983 the Trustees of the National Library of Scotland annnounced the establishment of a Scottish Science Reference Library. Unfortunately, it looks as if this library is to concentrate solely on science and technology as no mention has as yet been made of business.

A centralised Scottish business information resource based at an institution with established links with the business community and with an overview of the total business scene in Scotland such as the Scottish Development Agency or the Strathclyde Business School could provide the much needed focal point for information of relevance to business. The University of Strathclyde, of which the Strathclyde Business School is part, was cited as early as 1964 by the Department of Scientific & Industrial Research as one possible Scottish focus for a co-operative library service for industry. Furthermore, since September 1985 the Department of Information Science has become part of the Business School faculty. This Scottish business resource is not seen as a library in the traditional sense as this would only result in much duplication of material already available in Scotland. It is seen more as an information service centre equipped with current information technology, including viewdata systems, teletext, desk-top computers and online search facilities. Locally-compiled databases could all be linked through such a centralised electronic resource, and could subsequently make all information available in Scotland equally and easily accessible to all. This view is in part supported by the Capital Planning Information Report[8] which concluded that there was an urgent need for local databanks which could ultimately be merged into a national information system.

Information for industry is too important for the library service to ignore. The industrial structure of Scotland is being shaped up for the 21st century with the attraction of microelectronics firms and other companies using and developing high technology, and with the encouragement of small enterprise. The library service needs to develop a dynamic approach to the provision of business information if its service is to be considered an important resource. Responding to these economic changes, and developing the type of information services which will be used, the library service should be able to secure the future public availability of all relevant business information and really be at the forefront in aiding the information needs of industry.

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3. KENNINGTON, D. *The role of local co-operatives, with particular reference to inter-library lending.* Capital Planning Information, 1984.
4. *Assistant Librarian*, May 1983, 62.
5. COMMITTEE OF ENQUIRY ON SMALL FIRMS. *Small firms.* HMSO, 1971. (CMND 4811.)
6. CABINET OFFICE. INFORMATION TECHNOLOGY ADVISORY PANEL. *Making a business of information : a survey of new opportunities.* HMSO, 1983.
7. CAPITAL PLANNING INFORMATION. *Information and the small manufacturing firm.* Capital Planning Information, 1982. (BL R&D Report 5729.)
8. *Ibid.*

Appendix. *Checklist of sources of business information.*

UK Company information

British Companies Size Report.
Britain's Top 1000 quoted Industrial Companies.
Britain's Top 1000 Foreign Owned Companies.
Britain's Top 2000 Private Companies.
City Directory.
CRO Index of Companies.
CRO Directory of Companies.
CRO Dissolutions and Changes of Name.
Company Performance Scotland.
Dun & Bradstreet Register.
Extel Analysts Service.
Extel Book of Capital Issues.
Extel Book of Prospectuses & New Issues.
Extel British Quoted Companies Service.
Extel British Unquoted Companies.
Extel Capital Gains Tax Service.
Extel Dividend Record.
Extel Issuing House Yearbook.
Extel Handbook of Market Leaders.
Extel Registrars Service.
Extract Information Service.
Extract Major Shareholding Service.
Key British Enterprises.
Kompass UK.
McCarthy's UK Quoted Company Service.
McCarthy's UK Unquoted Company Service.
McCarthy's Energy Service.
McCarthy's Industry Service.
Register of Defunct & Other Companies.
Scottish Council Listing of Scottish Companies.
Scotland's Top 500 Companies.
Stock Exchange Yearbook.
Times 1000.
Who Owns Whom: UK.

USA Company information

Extel North American Company Service.
McCarthy's North American Company Service.
Moody's Industrial Manual.
Moody's Industrial News Reports.
Moody's OTC Industrial Manual.
Moody's OTC News Reports.
Standard & Poor's Corporation Records.
Standard & Poor's Register of Corporations.
Thomas's Register of American Manufacturers.
Who Owns Whom: North America.
Million Dollar Directory (Dun & Bradstreet).
Middle Market Directory (Dun & Bradstreet).
F & S Index of Corporations & Industries.

European company information

Bottin Europe.
Dun & Bradstreet Guide to Irish Manufacturers.
Europe's 5000 Largest Companies.
Extel European Company Service.
Handbuch Der Gross-Unternehmen.
Informations Internationales.
Kompass: Belgium and Luxembourg.
Kompass: Denmark.
Kompass: France.
Kompass: Holland.
Kompass: Italy.
Kompass: Norway.
Kompass: Spain.
Kompass: Sweden.
Kompass: Switzerland.
Kompass: West Germany.
McCarthy's European Company Service.
Major Companies of Europe.
Who Owns Whom: Continental Edition.
F & S Europe.

Marketing information

Advertisers Annual.
A–Z of UK Marketing Data.
Brad (British Rate & Data).
Consumer Europe.
European Directory of Published Market Research.
European Marketing Data & Statistics.
Findex.
International Directory of Published Market Research.
International Marketing Data & Statistics.
MGM Marketing Manual of the UK.
Meal Digest of Advertising Expenditure.
Mintel Daily Digest.
Mintel Market Intelligence.
Total Market Sizes (IPA).
UK Market Size.
European Trends.
Market Research Great Britain.
Marketing in Europe.
Retail Business.
Predicasts.
Worldcasts.

Company information – other countries

Bottin International.
Extel Australian Company Service.
Kompass: Australia.
Kompass: Indonesia.
Kompass: Morocco.
Kompass: Singapore.
Kompass: Taiwan.
McCarthy's Australian Company Service.
Major Companies of the Arab World.
Major Companies of Argentina, Brazil, Mexico & Venezuela.
Major Companies of the Far East.
Major Companies of Nigeria.
Principal International Businesses.
Who Owns Whom: Australia & the Far East.
World Directory of Multinational Enterprises.
F & S International Index.

Industry & product information

British Exports.
Business Monitor: Production Series.
Business Monitor: Miscellaneous Series.
Business Monitor: Service & Distributive Series.
Census of Distribution.
Census of Production.
Directory of British Importers.
Export Data.
ICC Business Ratio Reports.
ICC Industrial Performance Analysis.
Jordan's Industrial Surveys.
Kelly's Manufacturers and Merchants Directory.
Key Note Industry Reports.
Scottish National Register of Classified Trades.
Sell's British Exporters.
Sell's Directory of Products & Services.
Stubbs Buyers Guide.
UK Trade Names.
Centre for Interfirm Comparison Reports.

Statistics and trends

Basic Statistics of the Community.
CBI Industrial Trends Survey.
Bank of England Quarterly Bulletin.
Economic Outlook (London Business School).
Economic Trends.
EIU Quarterly Economic Review.
Fraser of Allander Quarterly Economic Commentary.
Incomes Data Services Report.
Henley Centre for Forecasting – Forecasts.
Monthly Digest of Statistics.
National Institute Economic Review.
New Earnings Survey.
Overseas Trade Statistics of the UK.
OECD Main Economic Indicators.
OECD Economic Surveys.
OECD Economic Outlook.
Reward.
Scottish Economic Bulletin.
Annual Abstract of Statistics.
British Labour Statistics Yearbook.
Executive Remuneration (Management Centre Europe).
Scottish Abstracts of Statistics.
Social Trends.
UN Yearbook of International Trade Statistics.

Financial Press

Barron's.
British Business.
Campaign.
Daily Telegraph.
Department of Employment Gazette.
Les Echos.
Economist.
Far East Economic Review.
Financial Times.
Financial Weekly.
Forbes.
Frankfurter Allgemeine Zeitung.
Glasgow Herald.
Guardian.
Handelsblatt.
Hints to Businessmen.
International Herald Tribune.
Investors Chronicle.
Irish Times.
Lloyds List.
London Gazette.
Neue Zurcher Zeitung.
New York Times.
Observer.
Scotsman.
Sunday Standard.
Sunday Telegraph.
Sunday Times.
Survey of Current Business.
Stock Exchange Daily List.
Wall Street Journal.
Die Welt.

Miscellaneous

Business Periodicals Index.
Financial Times Index.
Times Index.
Public Affairs Information Service.
Research Index.
Reports Index.
TIMETABLES: British Rail.
  Thomas Cook International.
  ABC World Airways Guide.
  ABC Rail Guide.
  UK Telex Directory.
  International Telex Directory.
Councils, Committees & Boards.
Directory of British Associations.
Directory of European Associations.
Encyclopedia of Associations.
Economist Intelligence Unit Special Reports.
Economist Intelligence Unit World Outlook.
Industrial Aids in Britain (Walker & Allen).
Owen's Commerce & Travel Register.
Stores, Shops & Supermarkets Retail Directory.
Trade Association & Professional Bodies of UK.
Trade Contacts in Arab Countries.
Trade Contacts in Eastern Europe.
Trade Contacts in West African Countries.

Software evaluation

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Revised version of a paper originally presented at the IFLA (International Federation of Library Associations) Conference, Chicago, USA, August 1985.

Introduction

There are many services available to librarians and information workers who are considering the purchase of computer software to exploit the benefits of automation. In this paper I want to show how this information might be used in practice.

I want to concentrate particularly on the process of defining information retrieval problems; the problems which, it is believed, computers can solve.

Defining the problem

Success in introducing automation into a library does not depend on how much you already know about computers. Indeed, I believe there are dangers in knowing too much about these machines when defining the information and operational needs of a library. The term 'naive users' is frequently used in Britain to describe non-computer people but this is not a very accurate description. Most people have some awareness of automation and its potential impact on our work and our lives. This may result in a fear about the effect of computers on our jobs or perhaps an over-enthusiastic belief in all the exaggerated claims of manufacturers and journalists. Both of these attitudes are unnecessary; we must view computer systems as pieces of operational equipment.

Our job, then, is to ensure that they do what we want and we may even wish to take the option of not using them. To make them successful we must be able to describe our work, and the way we use information, in terms that can be translated into the language of computers. However, description of techniques to do this appears to be a neglected area of library automation. There have been many attempts at specifying ideal library systems, and there have been varying degrees of success in their conversion into working software. It can be argued, however, that it will always be difficult to produce a machine equivalent of a people-based process and to incorporate sufficient of the special features of libraries, including their national, regional or local identities.

I believe that there is much to be gained from exploiting the special features of automation; in particular those manipulations or routines

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that humans cannot achieve. But developing special software for every installation is prohibitively expensive. This is why I have concentrated on the use of commercial software for information retrieval. These packages have all the right 'consumer' features:

- ease of use;
- tried and tested features;
- large user community;
- built-in routines;
- (usually) compatibility with other systems.

They demand, of the user, an exemplary level of consistency in procedures and terminology and come cheap and 'ready to go'. They are, of course, only a partial answer to a full system, but I shall return to integration of systems later.

The process of analysing the structure and use of bibliographic and other records for comparison with the abilities of commercial information retrieval packages is relatively easy. The following are the sort of criteria to look for:

- number and size range of records;
- searches required (including time constraints):
    - (a) routinely;
    - (b) on demand;
- housekeeping routines;
- lists, cards and reports needed;
- number of users:
    - (a) for recording;
    - (b) for retrieving.

There will be other factors relating to local constraints such as budgets, but the resulting list will be sufficient for the first stage in finding suitable software.

Finding the software

The creation of a short list of appropriate software is a relatively easy process of comparing requirements with the advertised abilities of available software. Information processing capabilities, storage sizes handled and performance will all be available in directories or from the suppliers.

There may be some internal factors that will in practice limit your choice. One of these is that you may already have a machine, or have access to a machine. Your parent organisation may have a software purchasing policy to ensure compatibility. It is becoming increasingly important to consider the compatibility of systems within organisations and for wider communications.

At Aslib Joyce Copeland and I have just completed a two-year research project for the British Library into the application of local area networks for information activities within organisations. This set of techniques for wiring together the computers in the different parts of an organisation, to share resources and information, will, we believe, have a profound impact on library functions. Information is a significant corporate commodity. Therefore, when short-listing software there are very important questions to be asked about integration – that is, the transferability of information – with other applications and systems. The resistance of manufacturers to this threat to their monopolies is, thankfully, subsiding. In a recent test by one of Aslib's clients, five different information retrieval packages were able to read and process the same word processor file. This also, as you can image, was an enormous help in evaluating the packages.

The lists of software you select from must of course be up to date. The National Computing Centre produces a monthly directory (*Microsystems Centre Software Directory*) and this lists packages from 1,000 software houses; there are, on average, 125 changes per month.

In summary, then, there are many sources of information on packages; if you bear in mind the points I have made it should not be too difficult to find a few packages to evaluate in more detail.

Evaluating the software

The final evaluation will be very time-consuming and there is a fine confusion of facilities to aid or hinder the search. The Appendix and Further Reading sections list organisations and references that may be of use.

There is one general point I would like to make. The expense of full evaluations has led to a variety of 'self-help' solutions. One of these is to exploit the experience and opinion of existing users. There are a number of directories in Europe and the USA which identify the users of specific packages and, effectively, encourage contact from potential purchasers. The philosophy behind this sharing is, of course, admirable but could you, as a user, really spare the time to demonstrate your system to others? And could you, as an enquirer, guarantee that your situation is exactly parallel to that in the existing installation? Proper evaluations can only be achieved by testing the ability of the software to fulfil your specific needs – the ones we dealt with when defining the problem in the first place. There are no short cuts at this stage.

I want to mention one or two developments in evaluation services. The National Computing Centre directories, mentioned earlier, are now available on computer disk for subscribers. Searches can be made for package name, supplier, operating system, application. The technically minded may be interested to know that, rather than employ any particular package to do this searching, they utilise the facilities of Microsoft BASIC, which includes a crude string search.

There is an interesting new organisation which began trading in Britain in 1985, called Software Information Limited. They provide a free information service, matching enquirers' needs with a computer file of suppliers and their products. The user's needs are established in extensive telephone interviews. They are apparently independent of particular suppliers and achieve their income through commission from the suppliers.

Finally, it seems to me that it is possible to suggest a rather different version of that classic 80:20 rule of libraries to describe the potential for the use of commercial information retrieval software in libraries. Commercial packages will perform 80 per cent of the required information retrieval tasks in libraries. The final 20 per cent, those functions which reflect local needs, can be dealt with in a number of ways. They can be fully automated, in which case you will need special software and this will consume 80 per cent of the budget. Or you can use up 80 per cent of the total project time in trying to find integrated packages with the flexibility and development potential to do all these jobs. Or you can regard these tasks as the ones requiring your direct involvement and the ones needing your particular expertise. Then you should only automate them when they become established routine.

When you are evaluating software, it is because you want to use it as a tool to complement your own skills. You not only have to use it but share your information management tasks with it. But in spite of all the talk about 'expert systems', the software cannot yet learn about the organisation and it will not have all your training and experience.

When you are evaluating software capability for your system don't forget to evaluate the human components as well.

FURTHER READING

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GATES, HILARY. *Directory of library and information retrieval software for microcomputers*. Gower, 1985.

HAMILTON, C.D., KIMBERLEY, R., *and* SMITH, C.H., *eds. Text retrieval: a directory of software*. Gower, 1985.

KEREN, CARL, and SERED, IRINA, *eds. International inventory of software packages in the information field*. UNESCO, 1983.

NATIONAL COMPUTING CENTRE. *Microsystems Centre Software Directory*. NCC Microsystems Centre. (Monthly.)

Appendix. *Organisations in the United Kingdom involved in services for software evaluation.*

ASLIB, THE ASSOCIATION FOR INFORMATION MANAGEMENT, INFORMATION HOUSE, 26–27 BOSWELL STREET, LONDON WC1N 3JZ. TEL: (01) 430 2671.

Provides information services, training and publications to international members and non-members involved in information management. Current services include library of *trade literature* on software and regular *user experiences* in publications such as *Program* and *Aslib Proceedings*.

LIBRARY TECHNOLOGY CENTRE, POLYTECHNIC OF CENTRAL LONDON, 309 REGENT STREET, LONDON W1R 8AL. TEL: (01) 580 4562.
Demonstration and *free advice* on library automation packages; maintains *database of software* packages; publishes *experiences of users* in various journals. (Funded by the British Library Research and Development Department.)

MICROSYSTEMS CENTRE NATIONAL COMPUTING CENTRE, 11 NEW FETTER LANE, LONDON EC4A 1PU. TEL: (01) 353 0011.
Information, training, publications and consultancies for business computer users; self-funded; *directories* of hardware, software and training produced monthly from extensive databases; *reviews* and *trade literature* being collated.

EUSIDIC (European Association of Information Services), PO BOX 429, LONDON W4 1UJ. TEL: (01) 546 7968.
European organisation concerned with automated bibliographic activities. Has assembled a *database of software use* in Europe which is to be made available online.

LEARNED INFORMATION LTD, BESSELSLEIGH ROAD, ABINGDON, OXFORD.
Have compiled an international *register of experts* willing to review microcomputer software. Copies of software provided to perform *practical evaluation*, subsequently published in *Electronic Library*.

Creating an information service

Sylvia P Webb

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Translating and the Computer 5

Edited by
VERONICA LAWSON

Proceedings of the Fifth Translating and the Computer conference
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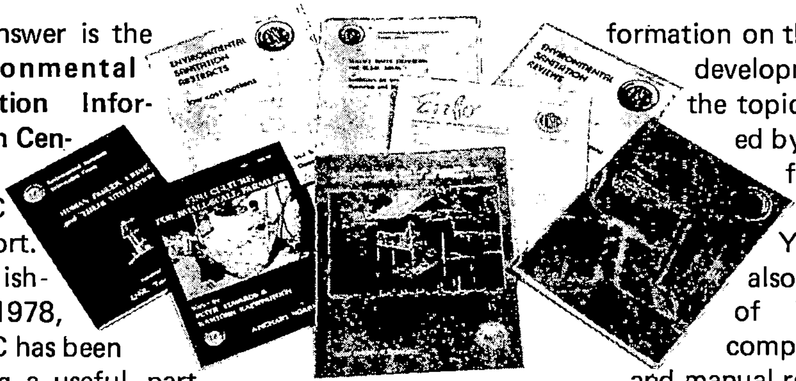

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MORPHS – an intelligent retrieval system

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Revised version of a paper presented at a joint Aslib/Society of Indexers Evening Meeting, Aslib, Information House, 10 October 1985.

It may appear rash to claim that an information retrieval system is 'intelligent', even if such claims are made within the limited context of artificial intelligence; nevertheless, such a claim is implicit in the MORPHS acronym: minicomputer operated retrieval (partially heuristic) system[1]. What is a heuristic system? Heuristics are systems where the instigator is less than completely certain about the outcome of material fed into them. This is not the type of behaviour most would expect from a computer system, where provided the program has been written correctly, the software and hardware are functioning correctly, and the limits of the system are not exceeded, results are highly predictable.

Affix handling

MORPHS was originally designed to run upon a very small minicomputer which was smaller than most present-day microprocessors. Space was extremely limited and it was decided to save this by reducing the amount of variety in keywords: firstly by eliminating plurals, then suffixes, and finally prefixes. The routines established produce unexpectedly reliable results, but one could never guarantee 100 per cent reliability, although plurals to singular conversions have always been handled correctly at least 95 per cent of the time. The risks involved may be illustrated by an early product of the routines, namely *IM*–this intially puzzled us until it was realised that *IM* was the 'root' of *animal* once the 'suffix' *-AL* and 'prefix' *AN-* had been deleted. When the system had been established it was known there would be risks; nevertheless, the quoted example was totally unexpected. It must be stressed that this particular problem has been resolved, but the risk remains and is inherent in heuristic systems. On the other hand the potential benefits frequently outweigh the risks. The original quest for vocabulary reduction was achieved. Furthermore, the majority of transformations were performed correctly, and very few faults at the search stage could be traced to the stemming algorithm. In short, the risks appeared to have been justified.

At an early stage in the design of the MORPHS software it was decided the routines for searching should as far as practicable be identical to those employed for loading. As it is far simpler to describe a retrieval system in

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terms of its search function, this aspect of MORPHS will be stressed, but it should be remembered that this is usually identical to comparable loading routines.

The information formerly stored in the outermost affixes is stored in the form of roles. Thus the searcher is able to specify either the derived form of a word or its root. The former is regarded as the normal form and the user remains unaware of the stemming and roling operations. This has the advantage that morphological variants are handled as synonyms: thus *bi-*, and *di-* share the same roles. Similarly *-ation* and *-ing* are treated as synonyms. This serves to increase recall and does not appear to affect precision. Unfortunately, searching for the root form involves using control characters: if slashes are used in front prefixes are ignored; if slashes are used behind suffixes are ignored, and if at both ends the root form is sought. Control characters are unsatisfactory and it may be necesseary to modify the system to supply the underived forms of the work on a probabilistic basis. For instance, the root form might be substituted automatically if no, or few, postings are found for the derived form. The way in which affixes are handled is summarised in Figure 1.

FIGURE 1. *Affix handling in MORPHS.*

WORD	*PREFIX*	*ROOT*	*SUFFIX/ES*
tyres	–	tyre	-s (plural)
buses	–	bus	-es (plural)
bureaux	–	bureau	-x (plural)
vulcanising	–	vulcanise	-ing
vulcanisation	–	vulcanise	-ation
prevulcanised	pre-	vulcanise	-ed
unvulcanisable	un-	vulcanise	-able
/vulcaniser	IGNORE	vulcanise	-er
/vulcanise/	IGNORE	vulcanise	IGNORE

The essential elements of the system are now well over ten years old. An attempt was made to alter the suffix handling to make it more heuristic[2], but the method was found to be less robust and the original algorithm has been retained. The lists of affixes associated with the routine have been greatly extended and errors have been eradicated. Considerable reliance has been placed on the substantial lists of affixes and irregular plurals found in Quirk's monumental *Grammar of contemporary English*[3]. This has been amplified for scientific usage by consulting Flood's terminological studies[4,5]. Some consideration has also been given to medical terminology[6], but full implementation of MORPHS in a medical environment would probably involve some modification of the lists: fortunately this is a simple process and does not involve programming. It is now possible to handle exceptions and variants with greater ease due to the incorporation of a generalised word replacement routine. The system can handle multiple affixes, but as noted only the information from the outermost is stored. In addition, a separate negative role stores information gathered either from suffixes or prefixes: this complements the other role routines.

Variant word forms

Alternative word forms include morphological variants (such as compounds), abbreviations, synonyms, homographs and exceptions to the affix and plural handling routines. Examples of each are shown below:

Morphological variants
water stop
water-stop
waterstop

Abbreviations
NMR

Synonyms
Cote d'Ivoire
Ivory Coast

Homographs
bank (finance)
bank (slope)

Exceptions to affix routines
winter *(-er is NOT a suffix)*

Spellings
sulfur (American)
sulphur (British)
plimsoles (incorrect)
plimsolls (correct)

With the exception of homographs most of these variants call for some form of substitution (*water* [space] *stop* might be replaced by *waterstop,* for instance) and the user may need to be informed that the change has taken place.

It is possible to disambiguate homographs during automatic indexing through an analysis of their collocates[7]. Thus:

bank *(financial) collocates with:*
money, finance, teller, pounds, etc.
bank *(slope) collocates with:*
slope, edge, climb, etc.

Unfortunately, traditional Boolean searching is unlikely to provide sufficient contextual clues to automatically resolve homographs – hence the need to use what is essentially an iterative process in which the searcher is informed that the word has more than one meaning. Nevertheless, in many cases it is possible for the system to assume the most probable meaning is being sought and supply the postings for that, plus the alternatives. Thus, if *China* is input, the system assumes the searcher is interested in the People's Republic and not in porcelain, but also notes that the user may have meant *ceramics* or *Taiwan* for instance:

China may be assumed to mean the Chinese People's Republic, in which case the user would be informed:
China implies Chinese People's Republic see also ceramics and Taiwan
or might be informed:
China is ambiguous use Chinese People's Republic or Taiwan or ceramics

In general, the user need not be informed of changes introduced to accommodate exceptions to the way in which affixes are handled. These substitutions may either be performed at a high level prior to any of the affix handling routines or at a low level after affixes have been removed. The latter option is useful for accommodating synonyms with several derivations. For instance:

stiff = rigid
stiff(ness) = rigid(ness)
stiff(ly) = rigid(ly)

The user would be informed that *stiff* had been replaced by *rigid.* The system of messages can be extended to inform the user of other appropriate words to use at the search stage. For instance, within rubber technology the words *vulcanise, cure* and *crosslink* overlap in meaning and it is possible to inform the searcher of this. Thus the user is automatically supplied with the appropriate elements from a thesaural-type system of cross-referencing. It is hoped that these will enable him to extend or modify his search strategies. Some consideration has been given to permitting the user to switch off these messages, but in general the user will automatically be supplied with them as the search progresses.

Phrases and compounds

MORPHS offers two distinct ways of handling compounds. Some may be appropriately handled as part of the routines for morphological variants considered earlier: others may be handled via a 'looser' system to be considered later. In some cases it may be possible to replace a homographic compound with a single word. For instance:

french chalk = talc
china clay = kaolin

In others this may not be possible and it may then be desirable to concatenate the words to form an artificial compound of the blackboard-type as in:

New York = newyork
New Mexico = newmexico

Topographical compounds form a particularly rich area for names of this type. Morphological variants may also be concatenated as in:

water stop = waterstop

On the other hand it is possible to use the same routines to split compounds into their elements as with the abbreviations considered earlier.

Positional roles

MORPHS also provides another way of handling compounds or phrases: namely, that of positional roles. This is not a novel idea, as it was widely advocated about twenty years ago[8]. In a phrase the initial letters of the words on either side of the word in question are stored as roles. This provides a simple way of avoiding the classic *venetian blind/blind venetian* situation as the former is coded:

	Role 1	*Role 2*
venetian	*blank*	*B*
blind	*V*	*blank*

Whereas the latter is coded:

blind	*blank*	*V*
venetian	*B*	*blank*

An example of a three-word phrase *(nuclear magnetic resonance)* is shown below:

nuclear	*blank*	*M*
magnetic	*N*	*R*
resonance	*M*	*blank*

Most prepositional phrases are automatically translated into their non-prepositional equivalents and then roled as before, for instance:

resistance to ageing

becomes	ageing resistance		
and then	ageing	*Role 1 blank*	*Role 2 R*
	resistance	*Role 1 A*	*Role 2 A*

An important feature of the positional roles is that they only function during the search stage if the compound form (or part of it) is entered. Thus, in searches for single words the roles are ignored and in the specious Venetian example all forms of Venetian (whether blind or blinds) would be retrieved.

Data

In everyday usage data are interposed with 'normal' text. Within computerised systems data tend to be segregated from other types of information. In MORPHS data can be handled alongside ordinary text and it is possible to handle concepts such as temperature and hardness. Although it is not possible to load ranges of data (each value must be entered separately), it is possible to search for values within a range, as in: IRHD 80-90 (International Rubber Hardness Degrees). Negative values can also be handled: −25C.

Furthermore, the system is capable of accepting ranges expressed in their popular, abbreviated forms, for instance: 1988−92; 1985−6.

The system is to be modified to enable maxima and minima to be sought. It is envisaged that MORPHS could even operate as a type of database management system—a role it will fulfil within MRPRA.

Names

In earlier versions of MORPHS all names (personal, corporate, trade, etc.) were subjected to separate routines, but in the new version only personal names are treated separately. This special treatment is a consequence of personal names tending towards homography (one of the present author's names (Bell) is a typical example). Names are vast in number and are virtually open-ended. The ordinary system of plurals, prefixes and suffixes does not apply, but there is a need to handle specialised prefixes such as Von, De La and Mac. Lastly, initials need to be accommodated.

Obviously control characters are needed to input material (square brackets are used). Names can also be identified and tagged during automatic indexing. On searching names can be expressed as on loading (that is within square brackets), or in three common ways of expressing personal names with initials:

[Smith JW]
Smith, J.W.
Smith, JW
J.W. Smith

Machine should be subservient

The computer is capable of displaying information at a rate utterly beyond that achievable by typists. Thus the machine should, if necessary, be expected to write at length, whereas human replies should be as brief as possible. In MORPHS the range of user responses is minimised: responses are either single characters or are capable of being reduced to a single character. In the case of YES (Y) the ultimate abbreviation of a solitary carriage return is also acceptable. The range of responses is listed below:

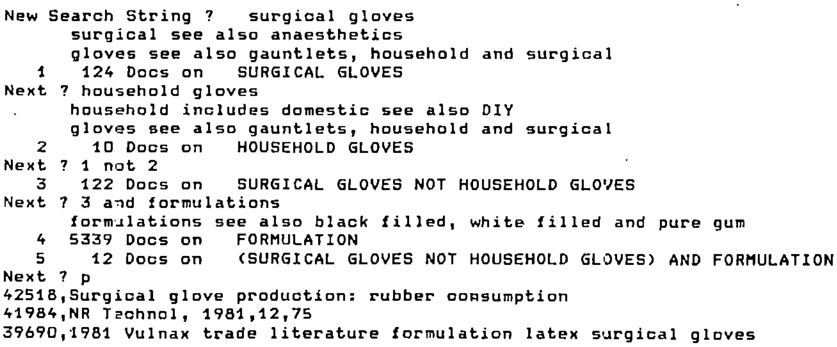
symbol	*implying*
Q	quit
P	print-out first lines
A	print-out abstracts
B	browse through database
R	recall earlier searches
S	start new search
H	help
Y	yes RETURN may be used instead
N	no

Otherwise the system assumes that the new user is inputting either a keyword or a Boolean combination, and this assumption is made at all stages in the search process. This saves wasted effort in typing.

Boolean combinations may be created either by connecting keywords with Boolean operators or by bringing together the numbers from earlier search statements – MORPHS assumes that numbers less than 100 and used on their own are search statements. Brackets may be used – in theory nested to any depth. Admittedly such techniques are far removed from every-day communication, but would the user really wish to correspond with the machine in sentences? A sample search is shown in Figure 2.

What can MORPHS know about the searcher?

It is envisaged that MORPHS is likely to have two types of user within its present environment – general users of the PRIME computer who will 'come to' MORPHS equipped with system passwords and hopefully a reasonable level of competence in using terminals, etc., and casual users. The latter will probably need guidance.



```
New Search String ?   surgical gloves
      surgical see also anaesthetics
      gloves see also gauntlets, household and surgical
   1   124 Docs on    SURGICAL GLOVES
Next ? household gloves
      household includes domestic see also DIY
      gloves see also gauntlets, household and surgical
   2    10 Docs on    HOUSEHOLD GLOVES
Next ? 1 not 2
   3   122 Docs on    SURGICAL GLOVES NOT HOUSEHOLD GLOVES
Next ? 3 and formulations
      formulations see also black filled, white filled and pure gum
   4  5339 Docs on    FORMULATION
   5    12 Docs on    (SURGICAL GLOVES NOT HOUSEHOLD GLOVES) AND FORMULATION
Next ? p
42518,Surgical glove production: rubber consumption
41984,NR Technol, 1981,12,75
39690,1981 Vulnax trade literature formulation latex surgical gloves
```

FIGURE 2. MORPHS search.

The VDU screen limits the amount of material which may be shown at any given time. At the start of a search session an extended message is displayed and appropriate help messages are available if the hapless searcher remembers to request them. HELP messages (relevant to the point reached in the search) are *automatically* displayed if no response is received after a further interval the searcher is automatically logged out. The time permitted is increased once the system knows that the user has become experienced – the system logs the number of search sessions per user. Two layers of confidentiality are incorporated: there are both degrees of confidentiality and confidentiality based upon document classes. There are also publicly-available documents. The user remains unaware of any restriction should this be applied to him or her.

The software

The program is written in FORTRAN, but does make some use of features from the PRIMOS operating system. For instance, the time-based help feature is based on a sub-routine available to Prime users.

Most of the lists used in association with the program are suitable for typical scientific, technical and general environments. The lists of affixes would probably need to be augmented to handle medical and (possibly) legal literature. Some of the words incorporated in the 'replacement' lists are common to most vocabulary, but the majority will need to be specially constructed to reflect specialist terminologies: construction of the lists is simple, however.

The basis of MORPHS is an inverted file, albeit with an unusual structure which has been introduced to provide very rapid loading and retrieval. This file can either provide references to document numbers (in MRPRA implementation to over 50,000 documents stored on microfilm) or to parts of documents (at MRPRA one line of the input string is the minimum display) or to abstracts or whole texts. Both of the latter are incorporated in the MRPRA system.

Future developments

A number of simple enhancements are likely to be introduced in the short term – all relate to the search stage. A short stop list will enable users to employ something akin to ordinary English should they be willing to waste typing effort. There will be some experimentation in displaying alternative outputs. For instance, the root form may be output alongside the derived form and the output from alternative homographs might also be listed. These techniques would:

1. lessen the amount of typing;
2. lessen the need for control characters;
3. probably broaden the horizons for the novice searcher.

The greatest hindrance to more natural searching remains the use of Boolean operators. To an extent dependence on these artefacts is reduced by using phrases (in association with positional roles) in their stead. Nevertheless, Boolean operators remain at the core of searching strategy. It may be assumed that the homographous nature of AND (possibly implying OR) is unlikely to cause confusion within a scientific environment, but NOT searches rarely produce results which correspond with what the user expects.

Conclusions

MORPHS was originally developed to be a mechanised version of a feature card system. Due to the space limitations of a very small computer, a number of routines were introduced initially to save space (such as the automatic elimination of plurals, affix and synonym handling). Subsequently, these were found to enhance performance and improved versions of these routines form the foundations, notably a general system of cross-referencing and word substitution, including an attempt to resolve the problem of homography. To an extent this is merely the re-invention of the thesaurus, but the thesaurus is being used in a far more dynamic capacity at both the input and search stages. It is hoped that this will enable users to improve their searching performance. Some common misspellings and American variants are incorporated and the user is informed if substitutions have to be made. Although the system is still based upon Boolean searching, this has been made as flexible as possible within its obvious limitations. Users are prompted automatically with HELP messages and this should make life simple for the novice. Every effort has been made to ensure that typing is minimised. From the very earliest days it had always been intended that MORPHS should be a user-operated, user-friendly system. We believe that progress has been made towards this goal. One important feature is that once the system has been loaded, the response time is very fast even for words with thousands of postings.

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Coping with software information

Silvina Peniston

Pyramid Computer Systems, Reading, UK

Concentrates on the organisational and indexing aspects of software collections. Unique problems are posed by:

1. *the complexities of the nature of software;*
2. *rapid changes taking place in the software industry.*

One needs to decide if the collection is to be current or historical. The organisation of the material and level of indexing should be matched to the use being made of the system. Evaluates different levels of indexing. Discusses the indexing decisions that are unique to the software/information technology field. References are given to more detailed information.

The volatility of the software industry together with the complexities of the nature of software itself pose unique problems for the information centre. A preliminary fundamental decision that affects subsequent treatment of the information is whether the collection is to deal with currently-available packages only; or be historical in either leaving an indexing trail to trace the history of each package from birth to death, and/or in keeping outdated material either as a whole collection or as a separate archive. Indexing trails may be useful as packages tend to resurrect sometimes in different not easily identifiable guises and enquirers may be using outdated sources of software information making the package difficult to identify. A back-run of software information would provide a basis for an analysis of developments in the field. There is at present no central national archive for software information that could be used for this purpose.

A second fundamental decision common to all information services is to match the organisation of the material and level of indexing to the use that is being made of the system. An alphabetical arrangement by name of software or distributor facilitates browsing if the subject field is narrow, but a subject arrangement may be preferred for multi-disciplinary material. Organisation also has to take into account the practicalities of filing the different media involved, for example, bulky manuals, books, articles and brochures, program print-outs and demonstration disks or tapes, and perhaps the software itself in the physical form of disks or tapes or stored online in a computer or videotex system ready for downloading to the user. Indexing may be at several different levels. In-depth indexing may be needed for core subject areas or specific types of software feature, especially new technological advances that significantly distinguish the package from the rest of the marketplace or are of particular interest to the user community. A broader level of indexing

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may be used for fringe areas with perhaps selective rather than comprehensive coverage of either the main packages in the field or only the technologically-significant ones. Alternatively the published sources could be used simply to identify packages in these areas such as software directories, online databases or the catalogues of large distributors. The nature of the record kept may also be at different levels. Due to the nature of the industry current information is usually in the short-term. It may be enough to simply provide subject access to the material rather than creating a bibliographic record. A more formal record is needed for permanent or long-term information to provide descriptive detail. This could range from a full catalogue record to a brief citation-type note. Minimum requirements for such a record are set out in the British Standard 1629 which is currently being revised to include computer software and machine-readable files[1]. There are also discussions of the adaptation of AACR2 (Anglo American Cataloguing Rules) to create a full catalogue record for software[2,3,4], and of the ISBD (International Standard Bibliographic Description)[5].

Indexing decisions that are unique to the software/information technology field again relate to the nature of the industry. An in-depth index will document all of these features. Packages become obsolete themselves or the machines that they run on become obsolete, but enquiries may still be received several years afterwards as there will still be sites where they are in use. Package names and features change constantly and they may be temporarily withdrawn from the market for revision. Enhancements or new software can be announced years before they become a reality. These may be such a radical change to the package or revolutionary advance that it is important for potential users to be aware of the impending changes. Software developed as a result of research or developed in-house may become commercially available or be available informally with no support. One package may have several distributors, this is especially true for popular microcomputer software distributed from high-street outlets. Several bureaux may also have services based on the same package. The decision is whether to be comprehensive in indexing suppliers or index only a main supplier, but keep details of others for reference. Suppliers may be specific to particular machines or operating systems, and internationally each country may have distributors who have renamed and even rewritten parts of the package or customised it for the language of the country. Another problem for indexing names is modular packages where there is a separate name for each module, which could be a stand-alone product and sold separately under a different name when alone. Utilities are also developed for packages either by the originator or by other software houses and organisations. Both modules and utilities may be filed separately or as an integrated whole with the package information. Both options will need cross references to link names and packages together. Features within the packages themselves may also be indexed if they are significant for retrieval by providing more detailed subject access for that specific application, for example, the type of logic used in an expert system or output provided from a cataloguing package such as COM, catalogue cards and OPAC (online public access catalogues). There may be links into other technologies, for example, optical disks or videotex gateways, or links into other subject areas, for example, database management systems with word-processing links or retrieval links to CAD/CAM. The information for suppliers is just as volatile as the packages themselves due to mergers, takeovers and bankruptcies in the industry and changing agreements with the orginators of the software. This is also true on the hardware side. Again indexing trails are useful but have to be balanced against the amount of effort needed to maintain them. The subject headings used may follow naturally from the software but a thesaurus or classification scheme could be used as a guide. The problems of subject indexing are described in a report from the American Library Association Subject Analysis Committee[6].

This discussion has concentrated on the organisational and indexing aspects of software collections. There are other aspects which have been discussed elsewhere in the literature, for example, lending of both hardware and software and all of the problems that this poses, and sources of information. Most suppliers maintain mailing lists and there are application and technology-specific exhibitions and trade journals[7-11].

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TOOLS for the TRADE

Translating and the Computer 5

Edited by
VERONICA LAWSON

Proceedings of the Fifth Translating and the Computer conference
10–11 November 1983, The London Press Centre

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Videotex and database management systems

W.R. Tuck

Department of Computer Science, University College London

Paper presented at the Aslib Private Viewdata Group seminar on 'Designing databases for viewdata', Aslib. Information House, 22 May 1985.

Videotex has developed, for the most part, along a separate path from that of traditional data processing. For this reason there have been relatively few attempts to merge the two fields, to apply the knowledge gained in the structure and management of traditional databases to the problems of videotex, or, on the other hand, to consider the user interface approach of videotex as a means of providing access to more traditional databases. In this paper we outline the historical reasons for this split, and indicate some of the ways in which a cross-fertilisation between the two domains could now be valuable.

Background

It has been suggested that, in comparison with traditional database and real-time transactional services, the principal emphasis in videotex is on the following features[1]:

- simplicity;
- ease of use;
- user-friendly environments;
- interactive capabilities;
- easy-to-learn procedures;
- low cost computer resources – minicomputers;
- low-cost terminals – microcomputers plus standard TV sets;
- inexpensive, standard software;
- videocolour features;
- low-cost, low-complexity graphics;
- a base in existing, proven technology, not in developments yet to come;
- an open door to bit-level protocols, with extensions to electronic mail, video conferencing, and other services.

Part of the reason for differences in emphasis between traditional databases and videotex is that the latter emerged from a quite different domain – that of TV and telephone, rather than that of computers and data processing[2]. Until recently, the three empires of 'Computing', 'Telecommunications' and 'Television' were very separate domains, with very different and distinctive modes of working. Deregulation (on the political level) and digitisation (on the technological level) have forced at least the first two much closer together. Changes in patterns of work and leisure will eventually bring the third within the same unified domain.

One consequence of this separation, however, has been the relative isolation of videotex from much that has gone on in traditional data-processing areas. It has often been pointed out that, although database technology has advanced significantly over the years, videotex systems are still based on facilities that closely resemble early file systems[3,4]. One starting point for our research at University College London (UCL) was the feeling that the research and development devoted to conventional record-oriented structures must surely be applicable to videotex facilities as well.

Parallel to the emergence of videotex has been the growth of micro- and personal computers (PCs). In spite of the obvious advantages in merging these two technologies, it is still the exception to find a PC that has been developed with a built-in videotex capability. The BBC micro—perhaps due to its origins in the TV domain—is one of the few. Yet microcomputer users now form the single largest sector of the Prestel market. The Austrian MUPID (Multi-purpose universal programmable intelligent decoder) project is perhaps the only example we have of a concerted attempt to link the capabilities of microcomputers and videotex into one integrated system[5]. The increasing duplication between these two separate development strands (PCs and videotex) is quite surprising.

Significant new ways of using computers passed very rapidly from being rather specialised facilities on mainframes to mass-market applications on micros. The obvious examples are spreadsheets, word processing and relational databases. Minicomputers, significantly, were to some extent bypassed in this migration of office automation software from corporate mainframes to personal machines. Minicomputers did, on the other hand, find an important role as hosts for videotex/viewdata systems. A relatively inexpensive multi-user machine, without bundled-in applications software, was ideal for the videotex software houses to use as a basis on which to build their systems.

Videotex as a front-end to Unix

Unix*, the old academic workhorse, has played little part in any of the important developments associated with videotex, on the one hand, or personal computers, on the other. Until very recently there were no commercially-available private viewdata systems based on Unix. This may well change over the next period. One factor, of course, has been the deregulation of the telecommunications market and, in particular, the effect this has had on the Bell Telephone Company, from which Unix itself originated.

Although Unix provides what many regard as an ideal software development environment, in its raw form it is not directly usable by end-users—unlike the simpler PC-based operating systems, such as CP/M (Control Programme/Microcomputer) or MSDOS (Microsoft DOS). It is first necessary

*Unix is a trademark of the Bell Telephone Company.

to build a front-end access facility, configured either to the particular needs of the application (for example, word processing) or as a general purpose menu system. There are a number of commercial products on the market that adopt this approach.

It has often been suggested that videotex, with its simple mode of interaction, provides an ideal front end, or window, into the general office automation environment[6]. This suggests one of the main themes of this paper: to what extent can we use videotex as a way of taming Unix? The idea is that all end-user applications software would be run through a videotex-like interface, using the familiar techniques of menu selection, response pages and a simple file sturcture to provide a uniform means of access to the machine. The presentation formats of conventional videotex would for the most part be retained, though in cases where this is clearly impractical (as with word processing or spreadsheets) the terminal would revert to the display mode appropriate for the application. The telesoftware model – with applications software called up from the videotex database and run on the local PC – is an implicit component of this way of working.

In Figure 1, a number of different application areas are displayed in their approximate relationship according to two parameters: frequency of use and relative complexity. Videotex is characteristically low on both scales, since it is designed so as to be easy to use by casual users. In this sense, it provides the logical entry point for a range of other services.

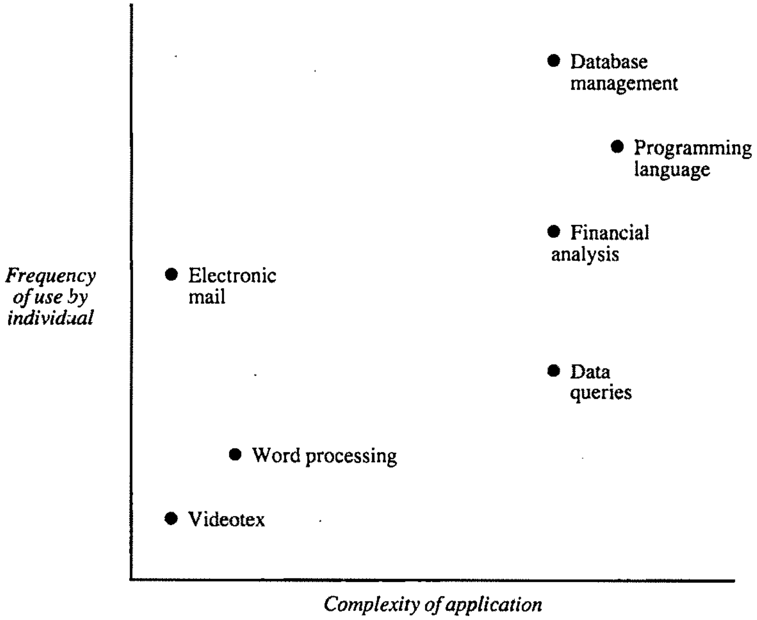

FIGURE 1. *Videotex as a window into office automation.*

The underlying model is that videotex is not so much a database of information as a method of accessing a network of available services. Nor is it necessary that all services reside on the same local machine, for the transaction mechanisms inherent in the videotex concept should allow transparent access to remote resources as well.

Videotex and relational databases

The other important thread that has run through computing in recent years is the way in which Relational Database Management Systems (RDBMS) have enabled the development of a very high level ('fourth generation') approach to applications software development. The simplest, and perhaps most familiar, example of this is the structured command files of dBASE II*. Such methods enable applications programmers or end-users to build systems very much more efficiently than with the older ('third generation') lower-level languages like PASCAL, COBOL or BASIC.

We would like to find ways of combining these two. The origins of the work done at UCL in this area lay in the feeling that such a combination should be possible and that the dual approach – combining relational databases and videotex – should provide a very powerful general framework for information systems. The UCL Computer Science Department is, like that of most universities, deeply wedded to Unix. Such an operating system is ideal for the kind of work we are most concerned with – developing and experimenting with communications software. Nevertheless we must recognise that for most end-users, direct contact with the operating system itself is undesirable. Concealing the system with a videotex interface driven by the machinery of an RDBMS, looked to be an attractive approach.

If the videotex front end and the RDBMS back end provide the basic facilities, then the meat in the sandwich will be the range of other applications that may be linked into the system; electronic mail, word processing, spreadsheet, etc. The most appropriate model may be that of telesoftware. The basic idea here is that the user fills in a request page, and receives in reply the software required for the particular application, which then runs on the local videotex access machine—which one may assume to be a personal computer of some kind.

Users do not form a homogenous group, and for each application they will demand different levels of sophistication. In the case of electronic mail, for example, many will be satisfied with the relatively limited form provided by videotex (as in Prestel), whereas others will want the full features of the CCITT (Comité Consultatif Internationale Télégraphique et Téléphonique) X400 Standard. Nevertheless, it should be possible to provide access to various levels of sophistication through the basic framework of videotex transactions, perhaps involving telesoftware.

Our first attempt at UCL to build a videotex facility based on a RDBMS used the Ingres software. This is widely available within the academic community and has been the basis of a number of experiments to hang data other than conventional records from within a RDBMS – graphical elements, for example, or in our case videotex frames.

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*dBASE II is a trademark of Ashton-Tate.

The initial objective was to duplicate the usual videotex retrieval facilities (menu selection, next frame, previous frame, quit, etc. – the familiar * # commands of Prestel) but with the underlying mechanics being managed by the RDBMS. Each videotex frame, together with its frame number, charge rate, routing information, and perhaps other data, would form a single record. The total number of fields (or relations) may be quite large and depends, of course, on the facilities one might want to provide–such as keywords for searching, or access tags.

The character codes of the videotex frame form one complete field. For some RDBMSs the non-ASCII control characters for colour, graphics, etc., may cause problems. A familiar example is dBASE II, in which the data types within the relations (fields) are restricted to being logical, character, or numeric. Some form of recoding into the standard ASCII set may be possible, but such code conversion will obviously entail a high overhead on performance. More sophisticated RDBMSs allow user-defined data types.

Performance problems of this kind, in fact, led us to abandon Ingres after first building a prototype system to show that the idea was actually feasible. This ran on a PDP11/44 under Unix; but the overhead of the Ingres RDBMS, which is a very large and powerful system in its own right, proved too great–it was too cumbersome, too slow, and too difficult to configure to our rather precise needs. In fact the sophistication it provided was much greater than our requirements, but there was no way of selecting out just those parts. The later versions were built around the Mistress RDBMS[7]. This provides a number of different control languages–including a C-language interface – and configuration of the system for a specifically videotex type of interaction was relatively straightforward.

The resulting system provided a hierarchy of access points, from the low-level needs of the systems' programmers (who have access to the full Unix operating system itself), to those of the information manager (with direct access to the RDBMS and control over the videotex database), and up to the application-driven demands of the end-user.

A keyword search facility was built into the system. This was relatively simple and merely required a list of the keywords for each frame to be entered into the record at the same time as the videotex frame was created. One desirable extension might be to provide means for doing this retrospectively, by automatic scanning of the text. This is, in general, not easy. A better method may be to go for a full-inverted index of the text-retrieval kind.

Once a keyword search facility is available, the conventional tree structure of the database becomes somewhat redundant – it remains primarily as a convenience for the information provider (IP), or for the local information manager. Page identifiers can be hidden from the user, and even the printed directory may be dispensed with. Whether this leads to more effective search strategies on the part of the user is still perhaps an open question[8]. What it does give is extra possibilities for information ordering, and a more user-determined rather than IP-determined access path to the required data.

In addition, links were provided for access to the general electronic mail facilities from within the videotex system. The sort of advantage envisaged here was the ability to generate messages while interrogating the database; it was not necessary to quit the database (thus losing one's place) before sending off a message. In a similar fashion, access to word processing and other standard facilities could be available through the videotex front-end. The presentation formats, however, would not necessarily be restricted to those of simple videotex.

Finally, it had been our intention to consider ways of increasing the intelligence of the videotex access machine. This would basically mean holding a set of directories local to the PC and using them in conjunction with a query-building facility so that the user can elaborate or refine the request before the access device tries to retrieve the information from the database itself. Although such a facility could, in principle, be incorporated in a single machine, it makes more sense to consider it as a collection of modules strung along a local area network (LAN). A system of this kind was built as part of the Project UNIVERSE satellite experiment. This involved linking a number of LANs—Cambridge Rings, in this case—to form a high-speed wide area network, with the OTS satellite forming a broadcasting hub or backbone to the network. Several separate videotex-like databases were set up on this network, including a photovideotex store at the British Telecom Research Laboratories at Martlesham, UK, and conventional videotex frames at UCL. One intention of the experiment had been to investigate the integration of heterogeneous distributed databases by means of a single DBMS, so that requests could be made in a completely transparent manner. Details of these experiments and an analysis of the results may be found in references 9 or 10.

Conclusions

As every librarian knows, there is a great difference between a classification scheme that enables known items to be located efficiently, and one that allows browsing among a range of possibly relevant topics. Traditional videotex, with its tree structure, is not particularly good at catering for browsers. Nor is it, in point of fact, very good at providing efficient retrieval[11]. Its main strength is that it is easy to learn and easy to use.

Several authors have discussed alternative strategies for efficient retrieval and for effective browsing within a videotex database (see, for example, references 12 and 13). One approach that we will follow in a continuation of this experiment is based on the standard free-text retrieval technique of inverted indexes. This has the advantage over the RDBMS approach of providing a much faster search and access facility, but at the expense of requiring considerable time to create the index for a database of any significant size, and a substantial increase in storage. One also loses some of the flexibility and power of the RDBMS approach. It is our intention to eventually combine the two to provide an optimal solution.

The suggestion we have been making in the present paper, however, is that it would be wrong to think of videotex as merely a rather simple form of information database. Instead, it is better thought of as a means of locating and accessing a wide range of computer-based services, both local and remote. In this function, many of the inherent features of videotex, such as menu selection, response pages, telesoftware and charging mechanisms take on much greater significance. Of course, as such a general purpose system develops it may begin to look less and less like the original Prestel and more and more like any conventional transaction processing system. But the convergence of the two must never be at the expense of making the user interface unnecessarily complex, and for that reason the uniform, simple but powerful mechanisms of the videotex concept are likely to be retained.

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Developing special library services in Fiji

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Country profile

Fiji is an island nation in the South Pacific, which whilst enjoying swaying palms, coral seas and a relaxed life style, also experiences many of the problems of Third World developing countries.

Situated just west of the international date line (a great advantage for immediacy of information – Fiji is experiencing 'tomorrow' whilst the UK is still only on 'today'!), in the vast Pacific Ocean, Fiji appears as a tiny dot on most maps – or does not appear at all. In fact Fiji is a collection of about 330 islands; some no more than a few metres in circumference, and only about one third are inhabited.

Fiji's geographical isolation is quite staggering. Its nearest neighbour, Tonga, is about 500 miles to the south-east of Fiji's main island, Viti Levu. Other major centres like Sydney, Australia, and Auckland, New Zealand are 1,960 and 1,300 miles away respectively – a factor that has far reaching consequences in terms of library provision. It's a bit like living in London with Cairo, Leningrad or Reykjavik as your nearest main city.

Fiji was a former British colony which gained independence in 1970. It has a multi-racial population comprising about 45 per cent indigenous Fijians and 50 per cent Fiji Indians. The Indians first came to Fiji in the late 1870s as indentured labourers to work on the sugar and banana plantations. The remaining 5 per cent of the population consists of Europeans, part Europeans, Chinese and other Pacific islanders. The majority of the 677,000 population live on Viti Levu, with the largest single concentration, about 63,000 people in the capital city, Suva, whilst another 54,000 people live within Suva's urban hinterland.

English is the lingua franca of government and business and is the official language of instruction in secondary schools, whilst socially and at home Fijian or Fiji Hindi are widely used. English is definitely a second language to the vast majority of people. Literacy levels are high at around 75 per cent. The predominantly state-run education system is free at primary level, although parents pay for secondary schooling. Further education is provided in Fiji via the University of the South Pacific, Fiji Institute of Technology, Fiji School of Medicine, and other courses including agriculture and teacher training are available locally. Government and foreign-aid sponsored scholarships provide training opportunities at overseas universities.

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My intention in this article is to give an outline of the range, development and future of special library provision in Fiji[1]. During 1985 I have been fortunate enough to work in Fiji under the auspices of Voluntary Service Overseas (VSO), as an adviser and training officer to special government libraries. My comments are based on observations and original research for a recent major review of all government ministry and department libraries, which was intended to identify the range of provision, assess the level and effectiveness of the libraries and make recommendations for their future development[2]. This *Review* has been considered by the government and its recommendations endorsed. Although there is obviously a gap between acceptance and action, nevertheless, this is an encouraging response.

History

The earliest known special library is thought to have been set up in 1904 at the then Colonial Sugar Refining Company (now Fiji Sugar Corporation) Agricultural Experimental Station, followed in 1907 by a library at the Supreme Court. However most special libraries were established in the 1970s and 1980s with a flutter of activity in the 1950s in the shape of the government-based forestry and medical libraries[3].

This sporadic birth of special libraries in Fiji has to be seen against a background of a relatively newly-literate society. There was no written language in Fiji before the mid-nineteenth century and only two generations have had prolonged access to written information. The first bookshop was not opened in Fiji until 1948. Thus an appreciation of the value and need for information is still a new concept and one that as such, has yet to attain widespread acceptance at all levels of business and government.

Special libraries today

The term *special library* in Fiji today relates to those based in government ministries and departments, statutory authorities, and large private companies and international/regional organisations with bases in Fiji. Most are concentrated in Suva. These libraries primarily serve the staff of the department including management, research staff and in some cases, students. For example, the Fiji College of Agriculture Library is the main resource for both students attending the College and the Department of Agriculture headquarters, and research station staff.

The main purpose of the libraries (government-based) is essentially to help inform the government. Fiji's increasing strategic importance and its role as a centre for communications within the Pacific basin, means that the government is now recognising the importance of effective information services in order to respond appropriately to the growing international pressure it faces.

Surprisingly for a small country, there are about fifty identifiable organised special libraries in Fiji[4]. Thirty of these libraries are based in government where both the staff and the library itself are the responsibility of the individual department; eight are run by the statutory authorities; and about another twelve are in private organisations such as embassies and international agencies. In addition there are perhaps another ten small 'working collections in government departments consisting of basic reference books.

The size of these special libraries varies considerable from approximately 400 items to over 10,000 in the larger systems. However the percentage of 'active' relevant items may be less than 50 per cent in some cases.

As yet, few of the libraries have substantial collections of audiovisual materials, although some of the natural science-based libraries are beginning to develop this aspect. However the cost and maintenance of imported audiovisual equipment is extremely high in Fiji, and the effects of high humidity, mould and heat, if equipment is not stored in air-conditioned rooms (and very few special libraries have this facility), are major drawbacks.

Factors affecting development of special libraries

As in many countries, special libraries in Fiji have been run along traditional ground rules of storage, guardianship and restricted access. Though there is some evidence that this attitude is now slowly changing, there are certain factors that will influence the growth of effective information systems:

Difficulties in acquiring materials

The pure distance of Fiji from the major publishing centres of the US and the UK, means that any order takes a minimum of three months to be delivered and sometimes up to two years, given that books must be sent by sea as air freight is too expensive. On average, special libraries in Fiji have to allow six months from ordering to receipt of materials.

There are very few local bookshops and those that do exist concentrate on stocking 'popular' titles and fiction. There is little prospect in the near future of them carrying the specialised texts required by special libraries as the outlay would not justify the small local market for them. As a result, special libraries have no access to preview books or select from the shelves and have to rely on publishers' catalogues and publishers' reviews.

Journals similarly are often received very late. Although the sense of immediacy for such items is not perhaps as pressing in the Pacific as it might be in an industrial library in Britain, the fact that a library has only received the January issue of a weekly journal in August can be rather disheartening, and certainly does not help promote the desired image of the library as an 'up-to-date' and 'useful' resource.

Money

Lack of funds, a problem for many libraries, is particularly so for any developing country with more immediate priorities. The effects of the world recession, poor sugar prices, hurricane devastation in 1983 and 1985 and the costs of a civil servant pay review exercise, means that funding for government libraries in Fiji is particularly difficult at the moment.

Most of the special libraries in Fiji do not have a definite budget allocation. Although some money may be available for special purchases from other funds, many libraries rely on aid money, exchanges, gifts and 'scrounging' to build up and maintain their stock. In fact it is a tribute to the resourcefulness of many library assistants that their libraries have continued to grow.

Some libraries have been the recipients of generous aid from foreign governments such as the British ODA (Overseas Development Administration) Book Presentation Programme and the Asia Foundation (US), or by receiving free copies of publications from organisations like the United Nations. Though obviously extremely welcome and necessary, and whilst not wishing to denigrate the tremendous support given, a reliance on aid books has its limitations for special libraries. Aid money tends to be for 'one-off' purchases and is rarely available for maintenance and continued renewal of the library. Long-term planning is thus very difficult when the main source of funding is irregular aid packages. Understandably, book aid is usually linked to the promotion of the donor country's own book publishers, but for some subject areas, books published in the UK or US have limited application to the needs of Third World tropical countries. Aid funds can normally only be used for book purchases, denying access to report and journal literature which tend to have a greater value to special libraries.

Sadly, the escalating costs of journals, particularly in the scientific field, puts them well beyond the reach of many developing countries. Thus the people who could most benefit from the research of others and avoid costly duplication of work, are precisely those who are often economically barred from that information in the printed form.

Most special libraries in Fiji have nothing in the way of abstracts and indexes and are unlikely to afford such items in the future. Although the University Library does subscribe to some international abstracting services, few special library staff make use of them due to the physical problems of getting time, cover in the library or transport to get to the University. Also, in reality, few special library assistants have the training to know how to use abstracts effectively.

Staffing

Of the fifty special libraries indentified in Fiji, all but two are one-person units and nearly half are only staffed on a part-time basis, (although some would not warrant full-time input). The ratio of women to men in these libraries is approximately 70 per cent to 30 per cent. There are few professionally-qualified librarians in Fiji with relevant special library experience, resulting in only six professionals working in special libraries in 1985, and three of those are expatriates.

The particular techniques of information dissemination that form the backbone of special librarianship, are still in their infancy. A part-time extramural certificate course in librarianship is run by the University, (at an equivalent level to a City and Guilds course in the UK). It provides library assistants, both in Fiji and by correspondence within the South Pacific region, with a good basic grounding in library techniques. Further training at degree or postgraduate level can only be obtained overseas. An important result of the *Review* recommendations has been that overseas scholarships in librarianship will be offered each year, which will hopefully in the future, produce librarians trained for special library work. Attachments and secondments to overseas libraries for staff to gain further experience, have recently been arranged covering public service, medical and parliamentary libraries.

The eventual employment of qualified librarians should improve the general status of all special library staff. However, at present, most of these libraries are run by library assistants (equivalent to junior clerical level), with little professional status, poor career prospects and subsequent low self-esteem. This image is compounded by the high number of women employed in the libraries in a society where traditional sex role stereotypes are dominant. Recent in-service training courses for special librarians from various organisations, as well as providing practical training, are attempting to rectify this situation and give library staff a greater sense of worth and respect. It is hoped that such courses will also pave the way for greater co-operation, mutual support and interchange of resources and ideas.

Conclusion

After many decades under colonial rule, Fiji has had only fifteen brief years since independence to establish the sophisticated infrastructure necessary for self-determination. Part of this infrastructure is the provision of special libraries and information services.

Against a background of financial, personnel, geographic and linguistic problems, there have none the less been impressive attempts to start and run special information services. New special libraries are now being organised as more managements begin to recognise and support the need for information. Currently a major (local) bank and a trade union are amongst those setting up such resources.

Increasing tertiary and university level training both in Fiji and overseas for local people, will expose more potential special library users to the role of information, which should result in increased demand and resources for special libraries.

The development of inter-library co-operation both in Fiji and abroad[5] will further the growth of effective services.

Although there is still much room for improvement, the commissioning of the *Review* exercise and its subsequent support by government and top management, has brought the whole concept of special libraries under the microscope and focused attention on them. Special libraries in Fiji should be on the agenda for significant development in the future.

REFERENCES

1. Although this article is concerned with special libraries, mention should be made of the three other main service providers: the University of the South Pacific Library — a regional-based resource; Library Services of Fiji, (part of the Ministry

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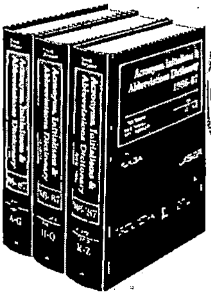

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Volume 38 Number 4 April 1986

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Volume 38 **APRIL 1986** **Number 4**

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Introduction

Aslib Biological and Agricultural Sciences Group (ABASG) Annual Conference, 'Information in the life sciences: the next ten years', Natural History Museum, London, 6 November 1985.

Planning a conference, even a modest one-day affair can be hell. I am sure Information House is full of talented hard-working people who can confirm this statement. One of the few activities that has even greater potential for generating anguish is trying to think of a conference subject theme. Almost immediately after the 1984 ABASG Conference was over, the Group's committee members were locked in a room while their meetings secretary refused to let them out until they had come up with a crowd-pulling and profitable topic for 1985.

The papers from that conference which appear in this and subsequent issues of *Aslib Proceedings* are evidence that the committee duly came up with the goods. ABASG's three previous Annual Conferences had dealt with specialised aspects of our subject interests. Consequently we decided that the time was ripe for an event that would take a more general look at the immediate future in libraries and information units in the life sciences.

Our speakers represented publishers and end-users as well as librarians, and I hope that the result was a balanced and worthwhile day. Many subjective and conflicting views were aired in the papers and in discussion, and that is the stuff good conferences are made of.

TIM CULLEN
ABASG Meetings Secretary

Aslib Proceedings, **38** (4), April 1986, p.99. Printed in Great Britain.

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Information services in a beleaguered agricultural industry

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Paper presented at the Aslib Biological & Agricultural Sciences Group Annual Conference, 'Information in the life sciences: the next ten years', Natural History Museum, London, 6 November 1985.

Since the late 1970s mounting concern about farming practices and agricultural policy has coincided with a steady decrease in the funds available for publicly-funded research. Major reorganisation taking place in agricultural research is forcing library and information departments to reassess the range of services they offer. The increasing pressure to seek commercial sponsorship in order to offset the effects of cuts, will have repercussions for information practitioners who will have to market their services more aggressively, extend their horizons, and increasingly come to regard information as a tradeable commodity. Information will become more commonly available to the end-user without the necessity for an intermediary, both on the farm and in the laboratory.

Introduction

Since the late 1970s many of the basic assumptions of farming and traditional attitudes towards it have been called into question.

This period of deep turmoil and painful self-examination in the agricultural industry has coincided with a reduction in the support of publicly-funded research. No research activity is secure any longer from the directive to solicit for sponsors in the marketplace and on the streets.

How will this all affect the information services that support agriculture? To answer this question we will first:

1. Look at the web of users and providers of information in agriculture and then;
2. Describe some of the more important pressures that have emerged in the past decade. It is only by understanding what motivates the industry now that we can even begin to guess what might happen in the next ten years.

Having done this we can speculate about the effects on librarians and information scientists.

Aslib Proceedings, **38** (4), April 1986, p.101–113. Printed in Great Britain.

One of the witnesses to the 1983 Agriculture Committee reporting on the *Organisation and financing of agricultural research and development* said that, 'The administration of agricultural R&D in the UK is complex'[1]. The Committee later came to recognise this as a considerable understatement. Innumerable reports before and since then have underlined this fact. R&D is, however, just one part of an industry which embraces the whole spectrum of agricultural activity from students, lecturers and research workers to farmers themselves and all the bodies that seek to advise, inform and influence their daily practice and decisions.

The information services which embed the industry, mirror this complexity. Not only are the paths along which information travels labyrinthine but much of the literature itself is 'grey' and unobtainable. This bibliographic and informatic nightmare is likely to become worse as existing information systems are threatened and as the concerns of agriculture widen to incorporate novel areas, such as biotechnology, and to take greater account of social and environmental issues.

It is not possible to attempt more than a brief outline of this maze. Anyone wishing to understand the organisation in greater detail can do no better than to refer to the Craig Report[2] which remains one of the most comprehensive and yet succinct summaries of the whole network of agricultural information. Although too few of its recommendations have been implemented, its influence has been considerable, largely as a result of the series of seminars which followed its publication and which ensured that it was actively discussed and debated thoughout the country.

Users and providers of information

There are many ways to portray the industry. I have chosen to highlight the main groups of users and their sources of information rather than to concentrate on systems and organisations. The user is, of course, our *raison d'etre.*

We all rely on certain basic sources for information – books, journals, magazines, newspapers, television, friends and acquaintances. The following groups which I have chosen to identify, differ mainly in the emphasis which each accord to a particular source. Each of these sources, in turn, relies on others. Users and providers are constantly alternating roles in the perpetual recycling of information.

The farmer, whom we might call the ultimate end-user, depends for information on a number of sources: friends and neighbours, the national and farming press, television, videotext and teletext, government and commercial advisers and, very occasionally, direct access to original research.

Journalists in press and television make it their business to foster personal contact with policy-makers and advisers in government, private industry, the research councils and universities. In addition they make extensive use of the literature emanating from these bodies in the form of select committee reports, advisory leaflets, press notices etc. They make less systematic use of the primary scientific literature, with the possible exception of the weeklies.

Journalists are responsible to a greater extent than any other group for presenting information to all levels of the industry in an easily-assimilable form.

Advisers – formal advisory work is carried out principally by the Agricultural Development and Advisory Service (ADAS) within MAFF (Ministry of Agriculture, Fisheries and Food), increasingly by private consultants and also by representatives of commercial firms. Advisers obtain information in a number of ways. From 1982 to 1984 Janet Agar[3] investigated the informational needs and information-seeking behaviour of advisers in the east of Scotland where the advisory services are provided by the Scottish colleges of agriculture. We have no reason to suppose that these requirements are any different from those of advisers in any other part of the country. She showed that most advisers rely particularly on personal contact, not only with farmers but also with scientists working in the Ministry and the AFRC (Agricultural and Food Research Council); few make use of scientific journals or research reports.

The pattern of *agricultural education* is equally convoluted. Undergraduate and postgraduate courses are available at the universities and HND (Higher National Diploma) courses in the eight agricultural colleges. There are also local authority and other colleges which offer courses, and the Agricultural Training Board provides a training service by organising courses or giving grants to employers for employees to receive training. Teachers and students in all these institutions need information at a variety of levels and one would expect their requirements to differ little from those in other disciplines.

Research and development is now carried out by MAFF, AFRC, DAFS (Department of Agriculture and Fisheries, Scotland), DANI (Department of Agriculture, Northern Ireland), the universities and private industry. The interrelationship among these bodies for funding research is byzantine in its complexity and is not a topic that I would wish to, or be able to, describe. Many of the present reductions in funding have been attributed to a desire to simplify this situation. Scientists in general obtain their information from the conventional corpus of primary scientific literature, but also rely on many informal sources, e.g. conferences, meetings and personal contacts[4].

Research workers in industry, however, where a far higher premium has always been placed on the importance of comprehensive, responsive information services, have enjoyed a level of information provision virtually unknown in the public sector. The reason for this is quite simple – industry has long recognised that it can only maintain an edge over competitors by being better informed. Many of the changes that we may have to encompass in the public sector are already normal practice in industry.

This is of course a supremely simplistic picture and does not take enough account of users in quasi-governmental organisations and the various marketing boards which are controlled entirely or in part by farmers.

Who now are the spinners, consolidators and providers of information? As I have said, because information flow is not unidirectional, users are often also generators. Many bodies not directly concerned with agriculture provide services and information to agriculture. There are, however, some organisations that are exclusively concerned with the husbanding and dissemination of agricultural information, and these include:

1. The Commonwealth Agricultural Bureaux which abstract the world's scientific literature as well as operating a taxonomic service and which, coincidentally, are undergoing a period of critical change. This reorganisation will have repercussions for us all.
2. *AGRIS* (Agricultural information system) also indexes the world's agricultural literature but, in addition, includes much of the extension and grey literature. It offers a free hard-copy service to the less developed countries in the form of *AGRINDEX* and affords the opportunity for national bibliographies to be produced in these countries. Difficulties exist with regards to British input to the system.
3. The National Agricultural Library in Beltsville, near Washington, USA, produces the *Bibliography of agriculture* and its online equivalent *Agricola* which in the future is likely to concentrate more heavily on North-American material.
4. AGDEX is an innovation in agricultural information. Originally based in the Edinburgh School of Agriculture, but now financed and being further developed with support from ICI, it indexes the popular farming press and pays particular attention to the grey literature which in agriculture represents an unhealthy proportion of the whole. A similar service *UPDATE* has recently been launched from the Welsh College of Agriculture. Although *AGDEX* offers access to a body of information that was previously unindexed, I should mention here the service that MAFF has enjoyed for many years from the manually-compiled index held by ADAS at Worcester.
5. Several services provide information on research activity in agriculture: *ACRIS*, a database maintained by the AFRC, lists its own research workers and the projects that they are engaged on; *AGREP* (Agricultural research projects) lists the same information but for the entire European Community, and *CARIS* (Computerized agricultural research information system), in theory at least, for the whole world.
6. Few users have direct access to any of these sources. Librarians and information officers act as their intermediaries. Agricultural information workers have only started emerging as an identifiable subset of the information community within the last 5–6 years largely as a result of the impetus given by the Craig Report[5]. Regional groups have sprung up under the umbrella of the Federation of UK Agricultural and Biological Information Groups whose parent body is ABASG.

Much could still be achieved in the way of co-operation and, I would like to suggest, by the formation of a single, national body concerned principally with the needs of agricultural information workers and the improvement of services within the industry.

Pressures and portents

We now have a backcloth on which to write *change*, and the word *change* in the opinion of many would be a gross understatement for what has been happening in agriculture in the last few years and which they might think more appropriately described as cataclysmic.

What are these pressures and how will they affect the provision of information?

Surpluses

Each year since 1936 a farming conference has been held in Oxford, UK. This prestigious gathering attracts a wide cross section of the agricultural community. The conference themes for the last two years, 'The paradox of plenty' and 'The future demands change', indicate quite clearly some of the present preoccupations of the farming community. Needless to say, information is rarely mentioned!

For the last two decades the main target of British agriculture has been to increase output. Financial incentives and official policy have encouraged this objective. Many farmers would now argue that they have become victims of their own efficiency, although efficiency as any agricultural economist will confirm is a concept notoriously difficult to define. The Common Market of the EEC (European Economic Community) of which Britain is a member, is producing more food than it can consume at prices so much above world levels that it is prohibitively expensive to export the surplus. This has resulted in the butter mountains and wine lakes that we are constantly reading about, and which are now joined by a grain mountain.

To suggest that these surpluses can be controlled by reducing prices is not realistic, for any farmer faced with a lower price per unit output whilst prices per unit input remain constant will seek to retain his level of income by increasing output still further. Reducing prices to a level where large numbers of smaller producers are bankrupted is unlikely to prove politically acceptable. The option of introducing quotas has not been greeted with excessive enthusiasm. Milk quotas have been in operation for nearly two years. The confusion that has reigned over their introduction has been cited as an example of how ill-prepared and uninformed British farmers and their advisory services were to deal competently with the issue. Cereal producers for the time being have narrowly escaped a similar fate. The solution that is currently favoured lies in increasing the efficiency of utilisation of inputs so that a specified amount can be produced as cheaply as possible.

Linked to the question of surpluses is the problem of hunger and poverty. This is primarily a problem of distribution – a political rather than agricultural problem, which is not to say that we can abnegate responsibility nor that we should respond with short-term panaceas only when the situation becomes critical. The best help we can give is to support the developing world in every way possible so that it is able to produce its own food in the long term.

Pollution and the environment

Intensive methods of production have resulted in extensive use of agrochemicals – fertilisers and pesticides. Concern is steadily growing that the environment is becoming polluted to the extent that life itself is threatened – the life of plants and animals and ultimately our own. Changes in farming practices such as straw burning encroach on the lives of us all. Added to this we see a gradual erosion of the countryside as farming extends into areas hitherto untouched, as hedgerows are uprooted and as the rights of walkers vanish. The environmental lobby has become not only more articulate but also politically more significant with the result that the investigation of methods for minimising the impact of farming practices on the environment has gained wider support from those that fund research. At Rothamsted we have long been aware of the importance of this perspective as the following list of research projects shows: biological methods of pest control, development of non-persistent pyrethroid insecticides, pest forecasting to make the application of pesticides that are used more timely, the use of earthworms to process various kinds of waste, methods to predict fertiliser requirements more accurately and minimise application rates to avoid possible pollution of water, and techniques for straw incorporation to obviate the need to burn.

Food preferences

Within the last few years increasing emphasis has been given by government to food research. An example of this new emphasis has been the incorporation of the word *Food* into the Agricultural and Food Research Council. Official recognition of the need for more food research has lagged behind a growing public change in attitude towards both the quality and the kind of food that we eat. The health food/vegetarian section of the community is no longer regarded as marginal, but is being increasingly recognised as a formidable influence as well as a potentially lucrative consumer group. Food has also become contentious. We have witnessed a butter battle and the suppression of a number of reports on nutrition within the last year. Associated with this new food-awareness has been the growth of a significant lobby for the rights and welfare of animals in experimentation and under intensive methods of farming.

Financial cutbacks

In other times these challenges would have provided the opportunity for new and vigorous research programmes to be developed.

The present government however, taking the view that increased agricultural production should no longer be the prime objective of research, has reduced funding and initiated extensive reorganisation of the research effort in agriculture. The research sector has been enjoined to become more commercially oriented, to 'privatise', in order to offset the effects of these cuts.

Information technology

None of what has gone before takes any account of the eruptions taking place in the information industry, where the rate of change and innovation must be unparalleled. It has become impossible to open any self-respecting journal or newsletter in our profession without being confronted with yet another scenario for the future and, for some, as Geoffrey Taylor wrote recently in the *Guardian* 'Electronics has now made even presentology a puzzling enough discipline'.

If all we do is to assume an enhancement of the present we can expect faster communication, more and larger networks, the ability to store many different kinds of data more densely and retrieve the same in a greater variety of ways than before and to do this much more rapidly. With the emergence of knowledge-based information systems the prerequisite to be a computer literate/sophisticate will decline in importance as might the role of intermediaries, especially those unable to maintain their balance on the shifting sands on which we all now stand. Instead end-users will be increasingly catered for and the facility to access information directly will become common.

In the AFRC we already have a distributed X-25 network of VAX minicomputers which provides an electronic mailing system, gateways to other networks (including major database hosts DIALOG, IRS, Data-Star etc.), software for information retrieval and soon we hope for library housekeeping. We have laser printers, graphics facilities, graph plotters, map plotters etc. If we have these resources within the AFRC it is reasonable to suppose that many others enjoy them as well.

Centres of change in the next ten years

As information practitioners in agriculture, we are thus faced not only with large-scale changes in our own profession but also with great instability in the industry we serve.

Agriculture will inevitably have to face the consequences of over-production, environmental pollution and changing food demands. How this will be achieved politically and scientifically in an atmosphere of severe financial constraint will impinge directly on information services. Science policy has traditionally relied on research push rather than market pull as a working principle. The tables are now turning and publicly-funded research institutions are being compelled to look instead to the marketplace.

Having surveyed the present let me summarise the factors that we must take into account before making projections:

1. pressures in agriculture;
2. drastic financial constraints in research with pressure to privatise;
3. rapid rate of innovation in information technology;
4. a relatively small and unco-ordinated information profession.

These factors combine in a variety of ways so that any attempt to draw neat linear relationships between cause and effect would result in a facile analysis.

I have, therefore, grouped the likely effects under a number of broad headings, more for convenience than with any intention to define meaningful categories.

What then of the future?

Information for advice

As part of its advisory service the Ministry of Agriculture has, until now, produced a range of publications on almost every aspect of farming. These are widely used. Because of the withdrawal of funds from MAFF, ADAS will be reorganised. The introduction of fee-based advisory services is one of the ways that is being considered to raise income and pare costs. Another is the reduction, or even cessation, of all ADAS publications. This, in particular will have special consequences for the information profession as 'unofficial publication' will almost certainly increase and exacerbate the already serious problem of grey literature in agriculture.

The decrease in free government advice will also open the market for private consultants and a new generation of viewdata and microcomputer-based advisory services. Our ultimate end-user, the farmer will be confronted with a bewildering profusion of packaged advice from an array of sources, none of which will be free.

The expansion of viewdata may also have repercussions for advisors if the development of full-text databases containing digested information takes place thereby obviating the need to scan countless original sources. The practicalities of finding suitable people with enough time to write reviews of this sort have usually meant that the idea was earnestly promoted whilst seldom, if ever, effected. There is little kudos for scientists in this labour. In industry, however, the compilation of integrative reports has long been an activity associated with the information department. Perhaps we may find the public-sector librarian adopting a similar role. This idea is by no means new, in 1945 J.D. Bernal speaking at the 20th Aslib Conference suggested that 'the librarian should be master of the material itself and that he be in a position to present it in forms different from those in which he receives it'[6]. Brenda White[7] has, more recently, and with eloquence expanded on this view.

In the field of agricultural information viewdata represents one of the most interesting areas of development. The ADAS Development Unit (EDU) contributed pages to Prestel from as early as 1978 with the involvement of Peter Hoey in the ITPD (Information Technology and Procedures Division). Elsewhere agricultural librarians and information officers have been noticeable by their lack of involvement.

Now in addition to MAFF pages on Prestel other research information is being made available directly to the farmer, for example the Rothamsted Service through FARMLINK and most recently, through ICI's AGVISOR. Because there has always been some resistance to Prestel amongst the farming community, new approaches are liable to have stronger impact and therefore decision-support packages like COLLEAGUE may prove to be more successful especially if the number of farmers buying microcomputers for management purposes increases.

Videocassettes containing timely advice and information may also replace conventional weeklies and monthlies. The possibilities of this venture are currently being discussed.

Privatisation

The pressure to seek contract and sponsored research is growing and will become greater. While farmers may be willing to support 'fire-brigade' projects it is unlikely that they or industry will be prepared to support more fundamental 'ivory-tower' work or long-term 'blue-sky' research. Few companies are prepared to make long-term investments in the process of discovery if any benefits are just as likely to accrue to their competitors.

Potential sponsors must first be alerted to investment opportunities in the public sector. To this end the AFRC is forming a commercial policy section and is already contributing information to a database called *BEST (British expertise in science and technology)* to be marketed by Longman-Cartermill. This will alert commerce and industry to research presently underway and make available a pool of experts in various techniques who are able to provide skilled services.

The necessity to protect this investment by patent will mean that the role played by companies such as BTG (British Technology Group), and AGC (Agricultural Genetics Company) will become more visible. Associated with this will be the need for information practitioners to extend their horizons and become knowledgeable in the fields of patents, legislation and companies information. More generally we may expect that library services will have to respond to a larger number of more diverse requests for information from fields hitherto regarded as outside the ambit of agriculture. That these may also be for short-term projects will place another kind of burden on information provision – the demand for journal and other literature for a much shorter timespan. A heavier reliance on online services and interlibrary lending may develop to avoid the accumulation of many short runs of periodicals.

We will find as we move into a more commercial environment, what industry already knows; that market strategies for the future are totally overshadowed by national and international political decisions especially in the EEC. It will become our task to keep abreast of these political and legislative developments and assess the consequences that these may have for our readers. I recently visited the House of Commons Library where I was told that they all listen avidly to the Queens Speech in order to anticipate the demands that MPs will be making in the ensuing weeks. They don't make a list and wait. Library and research staff compile notes on likely topics so that queries when they arise can be immediately satisfied. This is an attitude that we will have to cultivate.

We may also have to think, as the scientists are doing now, of ways in which to sell our services and increase our apparent value to the organisations to which we belong, for example, Torrey Research Station has formed an Information Club to offer services and information to outsiders, and the MAFF Coordinating Committee for Scientific and Technical Information (MCCSTI) is currently considering ways in which to market information services. The British Library has recognised this tendency to regard information as a tradeable commodity and will be directing research effort to this topic in the next five years[8].

Public relations

Public relations will increase in importance at all stages of the information chain:

1. Farmers will need to promote their case more effectively to the public at large through the media and through such efforts as 'farm holidays' and, increasingly, have to be seen to recognise their responsibilities to the environment and under EEC law.
2. Research will need to present its effort more simply and more directly to the farmer in the form of publications, viewdata and the initiation of 'Friends' organisations to ensure sympathetic support and its own survival. The Royal Society has recently given new emphasis to the argument that there must be a greater public understanding of science with the publication of a report intended to stimulate debate and discussion on this topic[9].
3. We, especially, will have to market our skills more aggressively, convincing those around us of the value and availability of the services we provide and the breadth and range of our own skills. The 'library' must be seen as a place of first resort and the obstacle of impenetrable stacks , incomprehensible catalogues and preoccupied librarians must be eliminated. Users should not have to ask as Umberto Eco's hero did in *The name of the rose*: 'And is a library, then, an instrument not for distributing the truth but for delaying its appearance[10]! In agriculture, library-based information services have not maintained their profile to the same extent as they have in pharmaceuticals and medicine and run the risk of extermination in the present financial climate.

As the end-user is wooed more ardently, as for example, with the new medical package, somewhat confusingly named COLLEAGUE, which provides a user-friendly front end to *MEDLINE* and other databases as well as storing the full text of core medical journals, and as the feasibility of attaching skilled information brokers to research teams increases, the role of the library-based intermediary, too, will be subject to greater scrutiny.

Instead of regarding the end-user as a threat, an adaptable, confident information service should seize the opportunity to adopt yet another new function – this time as educator. We should welcome this emerging 'competition' sure in the knowledge that it will serve to awaken a larger community to the possibilities of online searching. As long ago as 1980 Pat Gallagher at Shell Research initiated an active programme to educate their scientists in the use of *CA* (*Chemical Abstracts*) and *BIOSIS* (*Bio Sciences Information Service*). There have been only beneficial results for the information service. More recent examples of a similar approach can be seen at Glaxo and ICI Pharmaceuticals. The penalties of failing to be in the vanguard will become only too apparent.

Research as future aid

The future is, of course, not possible without the present. How successfully we emerge from the next ten years depends on how much we know about the present and what we have learned from the past. The relevance of research is questioned as often in information science and librarianship as in farming. Few librarians apply the findings of research and fewer read of them – a British Library R&D seminar scheduled in 1985 on 'Making library research applicable' was cancelled because of lack of interest. In these circumstances advocating that more research should be done could be regarded as lunacy.

Few recommendations of the Craig Report[11] have been implemented. With cuts being imposed on the British Library as elsewhere there is little chance for any new research initiative in agricultural information. Perhaps this is the time to learn from what is happening around us and suggest that companies and firms who benefit from their role as information providers should consider funding research in the field.

It is true that we have faster, better tools although I wonder how widespread their use is. It is also true that the problem of non-use of libraries[12] still exists in this the so-called information age when we might reasonably expect all to be hyperaware of the importance of information. I think we may have been answering the wrong questions for far too long.

In any time of stress a natural response is to increase effort and output in an attempt to obliterate the problem. De Bono has described this reaction as the desire to dig deeper and deeper holes. It is, after all easier to go on digging in the same hole than to start all over again in a new place[13]. Surely, we think, if we produce more acquisitions bulletins, more current awareness and more SDI (selective dissemination of information) services we can't possibly go wrong. Few realise that what is needed instead is a complete change of attitude. We need to assess the situation anew and avoid, more than ever before, the accusation that we contribute to the problem of information overload. Our role as sifters, selectors and synthesisers must grow. And yet we find ourselves in many cases ignorant of the people we serve or of their informational needs. When we are aware of their needs we often fail to concern ourselves with what is done with the information we supply or to ask whether it has been of real use.

How often does a library or information service reflect the assumptions of the librarian rather than the real needs of the users? Like Nasrudin we look for the key under the light, where we can see, rather than in the dark, where we lost it.

Use and user studies have suffered a decline in status since the 1970s.

Brittain has suggested[14] various reasons for this state of affairs and proposed that there should be a movement away from assessment in terms of quantity to one of quality.

> 'It can be argued that the pre-eminence of the quantitative approach in research has de-personalized information provision and information use, has isolated them from the settings in which they occur, and has focused attention on the individual to the exclusion of the social aspects of these processes'[15].

Wilson, too has emphasised that research should be based upon a wider, holistic view of the information user[16].

The information requirements of advisers have been examined and at the Technical Change Centre a project is underway to look at the information needs of farmers, but more remains to be done. SERC (Science and Engineering Research Council) has recently funded a research project to survey how scientists and engineers acquire information. It would be encouraging if AFRC or MAFF were to consider sponsoring a co-ordinated project to look at the needs of all users in agriculture. Large-scale organisational changes are imminent in the AFRC and with these will come associated changes in the information service. Now would seem to be an ideal opportunity to design a service for the coming decade, one that satisfies those it is intended for and not those that provide it.

Summary and conclusions

Pressures in agriculture are forcing on us the need to be more adaptable, more flexible, more selective and to respond more quickly to the needs of our users.

All the advances in information technology offer us the means to achieve this goal, but they do not ensure that the information we provide will be relevant, pertinent or timely. That can only be achieved by maintaining a continual state of enquiry towards the communities we serve whoever and wherever these may be.

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The next ten years in the biology library

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Paper presented at the Aslib Biological & Agricultural Sciences Group Annual Conference, 'Information in the life sciences: the next ten years', Natural History Museum, London, 6 November 1985.

The aftermath of the electronics revolution and the probable continuation of a 'tight' financial climate; in particular the effects on libraries dealing with biological information and material.

Important trends in biological research and their repercussions on library/information services are discussed.

The increasingly interdisciplinary nature of many biological topics, e.g. language, the brain, acid rain, and the different clientele this brings to the biology library staff.

I hope this will be a down-to-earth look at life in the library, which will surely still contain books if not periodicals.

The latter part of the next ten years should see us living with the aftermath of the technical and financial upheavals now taking place, and although, of course, all innovation will not have ceased, it will be concerned with improvement and adaptation rather than a revolution in practice such as is at present under way.

Once the dust has settled after the bulk transfer of library operations from labour-intensive manual systems to electronic ones we will be forced, as we sit amongst our online catalogues, self-issuing book systems, and bibliographies of machine-readable publications, to come to terms with the resulting loss of professional identity. What will distinguish working in a biology library from working in a shop or a mail-order warehouse? All, by that time, will probably employ staff of similar educational levels. Will people spend their whole career working in what is only one type of service department – that is, the library? Many, probably, will not, since they will find that their electronically based skills are common to various industries and services. This can only be of advantage to both sides, since it will not only offer more choice of employment to the individuals concerned, but will also provide library staff with wider experience of the world and the marketplace than is usual today.

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Nevertheless, some will stay in libraries all of their working lives, and for them the distinguishing feature will be their knowledge of the literature and information sources of all types which are available in their subject field. That is, the type of knowledge that readers have always expected of their librarian. Thus the main currents of change in the biology library will no longer be technical and administrative but those which derive from changes within, and will concern the subject field itself: the type of research done and the financing of it.

These last two elements will have a considerable impact on stock and services. Some indications are already apparent, and although I have, of necessity, been limited to examples within easy view from Imperial College, I hope they can provide some basis for speculation as to what the future holds.

The research topic which looks almost certain to dominate the next decade is the study of the brain and its mechanisms at all levels, molecular, macromolecular and cellular. It provides, perhaps, the prime example of how interest in biological research is extending to scientists trained in other disciplines. Neural-structure models are used to explore the way people and animals think but they can also, by extension, be applied to the way machines 'think' and so to computer architecture and its design. For example, until now computers have worked serially, that is doing one operation after another. Compare this to the human brain which can control several processes simultaneously. Extended to the world of artificial brains, the fifth generation of computers predicted for the late 1980s/early 1990s should incorporate parallel processing. Perhaps they will overtake the human brain in the number of tasks that can be managed simultaneously, just as three dimensions can be exceeded in mathematics but not by our powers of conception. With sufficient sensors and intelligence, production robots will find their way around the factory floor without collisions, their output warehoused by automatic guided vehicles. Perhaps the automatic all-night bookshelver will have arrived, leaving even more time for professional reflection.

Other brain-related studies are less obvious. In the field of behaviour, for example, discovering 'what controls what' in the brain is casting light on such mundane but apparently insoluble problems as why bullfinches prefer the buds of fruit trees to other types. How do they find the fruit buds? And how do they communicate this knowledge to each other? Understanding how the brain controls such behaviour might enable us to substitute other, less valuable buds for those of the fruit trees.

Such studies as these will be made not only by biologists proper, and their usual allies in medicine and agriculture, but also increasingly by engineers, chemists, computer buffs and the like, all of whom will become clients of the biology library. They will approach the literature in a different way and by the use of different terminology, often describing familiar phenomena mathematically. They may compete for material with the traditional biologists and will in their turn influence what is written and published. It will become increasingly difficult both to classify this hybrid literature by conventional schemes and, more importantly, to retrieve it.

It is likely that online library catalogues will become of necessity an approximation to the online databases with which we are already familiar. Keyword indexes of titles alone will prove inadequate for most purposes, and indexing will have to reach at least as deeply as the contents list. The major hosts of online bibliographic databases already provide cross indexing, a trend which will probably develop to the extent that the whole search can be done, and references retrieved, at this secondary level giving, in effect, an encyclopaedic database undivided by subject field. This seamless robe would certainly be of great use to the expanded interest group served by the biology library.

Changes in the clientele of the library will not be all in one direction. The current interest in the environment promises to continue apace and the legislation and litigation involved create an increasing demand for sampling apparatus and statistical results. Those whose task it is to develop biological monitoring systems must apply production engineering techniques to biological materials in order to cope with the huge quantities of samples which must be processed to obtain statistically significant results. For example, our own Reactor Centre has to subject 5,000 dust samples to neutron radiation in order to monitor lead ingestion by children at the crawling stage who suck their dirty fingers. Another instance is our geochemical mapping unit which is constructing apparatus to deal with the half-million samples involved in the detection of molybdenum in soils. The presence of molybdenum in soil (and grass) leads to copper deficiency in cattle, a problem clearly of interest to biologists.

Areas such as these will increasingly lead us to become customers of engineering, legal and other libraries in our turn, and to need the expertise of their staff. This situation is not new, we have only to remember DNA and *The double helix*[1] to see that, but I expect it to become an ever larger part of our work.

The resultant mass of statistics from surveys should be easily handled by the computer techniques which will be available, and obtaining the precise biostatistics required from databanks will be an everyday service in the biology library carried out either by staff or directly by users.

Biological thought is not geared only towards new discoveries but also toward the reconsideration of the eternally-fascinating, fundamental problems of existence, and I expect the evergreen topics of the nature and origin of life and of evolution to continue to arouse controversy. Protein sequences are now cited both in defence of and in opposition to Darwin. Can such long and complicated molecules have been produced from random combinations? I doubt that the complete answer will emerge during the ten years to come but I do expect this and similar topics to be vigorously discussed. It will be of extreme importance for the biology librarian to ensure that all viewpoints are represented, particularly since political elements are now becoming involved and I certainly do not foresee that these will lessen. A good balance of stock has never been easy to obtain, as anyone who has tried to find some reasonable books on Lamarckism which are not in French will testify.

Again on fundamental issues, physics and biology draw ever closer together as the nature of matter is approached via quantum mechanics, now increasingly applied to biological systems. Do we affect an experiment by observing it? This is certainly a biological as well as a physical problem. The great questions of physics will continue to be relevant to biology and possibly be part of it. If, indeed, we are all separate facets of a single consciousness[2], so are our books, and once again we are aware of the blurring of subject divisions.

The tight financial climate, which is expected to continue, will affect the biology library both indirectly in relation to the orientation of research and directly by pressure on the library budget.

Demands for biological research which can be seen to be useful may well lead to distortion in the field of knowledge. To quote Michael Locke of the University of Ontario, 'The concentration of research effort upon medically related human biology has distorted current ideas on the generality of the way that living systems work. Cells in general are assumed to grow, divide, and function much as they do in vertebrates'[3]. Dr Locke, as an insect physiologist, is uncomfortably aware of this incorrect assumption. We should be aware that in the years to come we could find ourselves purveying *disinformation* unless we keep a firm eye on our stock, even retaining on the shelves some older works normally bound for the stack.

But it's an ill wind . . . and invariably someone will benefit from the situation. Research is not worthless just because it is fashionable. Malaria, and its veterinary form babesiosis, is still the world's greatest killer and strains of mosquitoes and cattle tick are constantly developing resistance to existing treatments. Monoclonal antibodies which act as a contraceptive to the parasite if transmitted in a blood meal promise a route to the production of a vaccine.

The corollary of pushing research funding in a particular direction when the total budget is fixed is the slowing of advance elsewhere. Genetic engineering is predicted to produce crop varieties of increased resistance to disease and to very virulent, broad-spectrum insect pathogens. Unfortunately, there is the current nightmare that makes a bounteous harvest a financial disaster while at the same time undernourishment and starvation are ever with us. Let us hope that political and social solutions are found before agricultural research is severely curtailed.

It will no doubt prove a blessing that the bookstock cannot, by its nature and bulk, rapidly respond to every fluctuation in research support. There are many regrets for the demolished buildings, incinerated documents and so-called worthless artefacts, disposed of in the past. We, armed with hindsight, will most likely err on the opposite side, but at least our hoardings will provide a foundation on which to build when the wind changes.

Finance and electronics will combine to render unavoidable a topic much disliked by librarians, that of security. This is both in the sense of measures taken against theft and to ensure the orderly functioning of the library, and in the sense of security of information.

The questions of theft and mutilation arise in connection with both old and new biological stock. As the standard botanical and zoological textbooks of the nineteenth century, many with beautiful plates and engravings, become increasingly valuable on the antiquarian market, they require closer supervision, yet remain a working part of the stock to which regular access is required even in the most up-to-the-minute institutions. Lichens, for example, recently shot to fame as air pollution monitors, and their ecology and taxonomy is again of great interest.

With very fashionable research topics, especially those with commercial applications, books and periodicals are extremely costly and competition for them severe. Instances of theft and mutilation, not to mention illegal photocopying, seem ever increasing and I foresee that we shall have to increase our activities in the security field at the risk of becoming unpopular. Viewing it as another aspect of conservation could increase its acceptability to library staff who have until now shied away from these issues.

With the reduction in routine procedures, long since handed over to computers, it will become increasingly difficult to justify staff numbers. Yet when we look at other depersonalised environments which are already with us we do not like what we see. Places become increasingly shabby, graffiti-covered and vandalised when the human element is removed, also very lonely. We have only to look around at railway stations, parks and so on where this is the case. We will need to make a concerted effort to stop libraries going the same way, and we may well be fortunate enough to be supported by a change in public opinion. However, this will necessitate the staff involved having something real to do, not just 'busy work' fabricated to replace lost routines. For example, there could be more research in librarianship coming from those actually working in libraries, and possibly staff could be shared with other departments in the same institution, to their mutual benefit.

Security and confidentiality of information are such wide topics that they can only be touched on here but when, as in our case, an assurance is given to research contractors that 'the College guarantees confidentiality and adherence to budget and schedule' we certainly feel the effects. The readers become paying customers with a real means of making their wishes felt. If the proceeds from, for example, the accelerated service required by their contract schedule come back into the library coffers is this such a bad thing? I think that our main difficulty will not be that of providing the services required, nor of coming to terms with the changed balance of power, but of ensuring that the library reaps the financial benefit of our efforts.

The future should bring better use of staff and equipment, a wider knowledge of literature and information sources in an enlarged subject field and greater interaction in the marketplace. In short, during the next ten years the biology library will have joined the real world. I am an optimist and I am looking forward to it.

The information society

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Keynote paper presented at INTERACT 85, Conference organised by the British (Northern Ireland Branch) and Irish Computer Societies, Newcastle, 7–9 November 1985.

Introduction

An information society is one in which labour has been intellectualised; one in which the expression 'to earn one's daily bread by the sweat of one's brow' sounds decidedly anachronistic. Employment in the information sector of the economy is growing apace – counterpointing stagnation and decline in the traditional manufacturing industries. Soon, terms such as information worker, knowledge engineer, ideas processor, symbol manipulator will be as common as weaver, cartwright and miller once were. As if to underscore this trend, the US Bureau of Labor recently reclassified the white-collar work-force as 'information workers'. The *soi disant* information society has come of age. What began life as a sociological construct and then became a feature of futurologists' patois before degenerating into a media cliché, has finally achieved respectability through endorsement by economic and political analysts. How has this come about and what does it portend?

The nomenclature of novelty

From the vantage point of the mid-1980s it is possible, applying social wave-front analysis, to chart global shifts in economic emphases and occupational distributions over time. Long-wave analysis was the approach used by Alvin Toffler in his book *The third wave*. Toffler identified three rolling waves of change, corresponding to the agrarian, industrial and information revolutions. Each of these successive (though not mutually exclusive) waves coincided with periods of fracture or discontinuity in social patterns and economic activity.

The history of 'economic man' is, of course, considerably more complex than Toffler's three-wave analysis might seem to imply, but the approach has the virtue of highlighting fundamental, structural changes in socio-technical activity. Mainstream economists and business analysts have also tried to unearth cycles in economic activity. Perhaps the best known long-wave cycle is that proposed in the 1920s by Kondratieff, a Russian

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economist, who, working on a battery of indicators from 1880 onwards, detected three long waves with a mean cycle of fifty-four years. Others have seemingly found evidence to support the view that economic activity displays regularity, periods of growth and recession following one another – as day follows night. Noteworthy cycles of business activity have been proposed by Juglar, Schumpter, Kitchen and van Duijn. There is, additionally, evidence to suggest that the frequency of basic innovation occuring in developed nations reveals a pattern of highs and lows, and, interestingly, that there is an inverse relationship between economic performance and level of innovation.

At the risk of oversimplifying, the major innovation associated with the third of the waves identified by Toffler has been the development of the computer – more particularly the development of microprocessor-based technologies and products. However, it would be misleading to supplant Toffler's preferred term 'the information revolution' with the expression 'computer revolution'. The former is a more precise characterisation of what is happening, though the developments and changes implied thereby would not have been so marked but for the advent of the computer.

Ultimately, it is not terminology which matters, but our understanding of the major changes which Toffler and many others have sought to elucidate is arguably not helped by the shifting nomenclature. The term 'information society' seems to have first been used in the late 1960s. Other common rubrics include: 'the information age'; 'the micro-millenium'; 'post-industrial society'; 'the computer revolution'; 'the infosphere'; 'knowledge society'; 'service society'; 'leisure society'; 'technetronic society'; 'electronic age'. Each of these highlights a particular dimension, or cluster of dimensions, but lacks the comprehensiveness of 'information society'.

The information explosion

Before the term 'information society' lodged itself in the vernacular, a number of writers, most notably Derek de Solla Price, at the end of the 1950s, had begun to look at the growth, structure and organisation of science. Price took a particular interest in the growth of formal communications in science. He looked at the increase in the number of scientific journals worldwide from the year 1665 onwards, and noted that 'the enormous increase in the population of scientific periodicals has proceeded from unity to the order of a hundred thousand with an extraordinary regularity seldom seen in any man or natural statistic'[1]. He further concluded that by about 1830 the 'process had reached a point of absurdity: no scientist could read all the journals or keep sufficiently conversant with all published work that might be relevant to his interest'[2].

Price also looked at the growth of scientific manpower and found a not dissimilar picture. Writing more than twenty years ago he was able to say that 'some 80 to 90 per cent of all scientists that have ever been, are alive now'[3]. Assuming another couple of centuries of 'normal' growth of science he was forced to conclude that this would mean 'dozens of scientists per man, woman, child and dog of the world population'[4]. The implications of unchecked growth of this kind are both obvious and absurd.

Price was a founding father of the discipline known as 'scientometrics'. He was the first to quantify the growth of science and to highlight the excesses (in terms of output) of post-war 'Big Science'. He also diagnosed science's 'illnesses', one of these being the 'superabundance of literature': a pathology which is even more problematic today than it was in Price's time. Science, for a long time, has been suffocating beneath its own output, a situation which has not really altered, despite advances in information science and despite orders of magnitude increases in the power and sophistication of information handling and communications technologies.

To some extent, the growing pains of adolescent 'Big Science' were alleviated by the development of computer-based information storage and retrieval systems. In the post-war years the character of science changed dramatically. The scale and level of funding changed significantly, as research became mission-oriented, multidisciplinary and matrix-managed in character. The utilisation of an ever-expanding corpus of research findings from an array of fields required new techniques for locating, retrieving and integrating information.

Information science and knowledge filtration

The majority of early information scientists were former researchers or career scientists who had deserted the bench in favour of a career in information management and control. During the post-war years, this élite among the information professions, pioneered many technical, procedural and operational developments to improve the efficiency and effectiveness of the information systems and services routinely used by their bench-tied colleagues.

The earliest developments in computer-based information storage and retrieval were in such fields as aerospace research, defence and medical research. Lockheed DIALOG, the major 'supermarket' online host (offering the user access to more than 200 databases/databanks from a wide variety of disciplines) was in fact created as an in-house research support facility for Lockheed Aerospace Division, and attracted such interest from the outside world that it 'went public' as an information utility. Today, Lockheed DIALOG is an independent trading company with a worldwide customer base in excess of 50,000. The natural history of Lockheed DIALOG's online service is a microcosm of developments in the rapidly expanding (and, for some, lucrative) online/electronic publishing business.

The application of computers to information storage and retrieval was one of the earliest attempts to, if not staunch the flow of scientific and research information, to improve control and access. The exponential growth in the volume of recorded information is reflected in the proliferation of online, commercially-available databases. In crude terms, there are more than 2,000 online databases publicly available today, containing, at a conservative estimate, in excess of 80 million records and growing at a rate of 8 million records per annum. The use of online databases is likewise on the increase, from unity in the early 1960s to many millions of user accesses per year. Even allowing for the short half life of much scientific literature and the irrelevance of much that is published, this still represents an almost insuperable challenge for the information science profession.

The real problem is not that of storage (though the associated costs here can be prohibitive), but that of sorting out the wheat from the remorselessly-expanding mountain of chaff. Studies carried out by bodies such as the Institute for Scientific Information (ISI) have starkly shown that the great majority of published articles are rarely, if ever, cited during their active life. In other words (and assuming that citation is an indicator of impact or relevance), the bulk of the articles, reports and monographs published by the academic/research world is of minimal import. According to Eugene Garfield, the pioneer of citation indexing and president of ISI, the company which markets the *Science Citation Index (SCI)*, 'some 25 per cent of the scientific papers published are never cited even once and ... the average citation count for papers that are cited is only 1.7'[5]. If highly-cited papers could be identified in advance and only these included in databases and libraries, the work of scientists, librarians, information scientists and others would be much easier. The problem, of course, is that we have no reliable means of predicting which papers are likely to be heavily or frequently cited. A Lotka or Pareto-like distribution seems to govern the scientific research community's use of recorded information. And, contrary to popular belief, the work of a small élite in science accounts for virtually all significant discoveries and advances. In an ideal world, we would concentrate on those authors whose work makes an impact and store only those papers which are likely to be cited at a significant level. In practice, this is impossible and the problem of information overload seems unlikely to find a solution in the new technology.

Technology the amplifier

In strict chronological terms the information explosion predates the much vaunted computer revolution. It was a direct consequence of the institutionalisation and professionalisation of science, the growth in funded research and the expansion of the tertiary education system. The computer was not the prime cause. However, in the intervening years the situation has changed in a number of important respects. The outpourings of scientists (and many other professional, administrative and lay constituencies) has continued to grow, but now growth is positively facilitated by advances in computing and telecommunications technologies.

Information technology ('telematics' to use the French neologism) is the foot on the accelerator which is driving societies into a post-industrial mode of economic functioning. The impact of the inappropriately labelled 'new technologies' on information processing and dissemination activities is pervasive and pronounced. Integrative information technologies ('computications' to use another neologism) do not simply enable traditional operations to be performed more efficiently, more cheaply or more cost-effectively: they can change what is done, how and why. In particular they are altering classical divisions of labour, deregulating professional life and opening up new wealth-creating opportunities for entrepreneurially-inclined technocrats. Control of the wealth-producing technologies is slipping, to some extent, from the traditional industry barons and conglomerates into the hands of (to use Toffler's expression) a 'new cognitariat'.

There is a complex of reasons and explanations, but it may be helpful to consider some macro-level changes in social and organisational interactions, access and control mechanisms and occupational ratios attributable to microprocessor-linked developments.

The socio-economic impacts of information technology

Amplification

Technology allows us to store more information, access more information, send more information more quickly than was previously the case. It is an energy amplifier – whether we are talking of computer-aided design, flexible manufacturing processes, image enhancement systems or word processing. Real reductions in labour-related costs can be attributed to information technology investments in a wide range of functional activities. In commercial terms this raises output, improves quality control, allows for customised manufacturing/service provision and gives high-tech companies competitive edge over their more manually-based market competitors. In the information business/information industry the availability of electronic databases linked via global telecommunications networks and gateways will increasingly marginalise traditional print-based repositories of information (e.g. libraries).

Globalisation

The growth of packet-switched networks and satellite communications and the associated cost-reductions in high-volume data transmission make a mockery of national boundaries. Information distribution has become a global activity, reinforcing McLuhan's vision of a global electronic village. Markets for information services and products are increasingly defined in international rather than national, regional or local terms. This both increases market opportunity and competitiveness. It has also created a host of new problems relating to ownership and control, and the flow of data across national borders.

Acceleration

Instant access to information (most notably financial, commodity or futures) is having a profound influence on the way banks, stockbrokers, speculators and investors conduct their affairs, and is likewise creating new problems for regulatory bodies. In the business and commercial sectors the wide availability of information (particularly value-added or proprietary information) is reducing the time required for decision-making and policy formulation. Decision-making is facilitated by easy access to electronic information stockpiles and, additionally, by the availability of a new generation of 'psychological' software designed for executive-level personnel.

Massification

The railroad and press barons of yesteryear have been replaced by a new breed of electronic information barons. Within the electronic information market, buy-outs, mergers and vertical integration are commonplace. Many companies, including blue-chip organisations like IBM, are moving into the electronic information business. Progressively, control and ownership is being vested in a relatively small number of resource-rich organisations. This has important, long-term social implications. An oft-cited fear is that, in the absence of explicit government regulation, a two-tier information society may emerge, consisting of a privileged, informationally literate élite and a disenfranchised information poor.

Decentralisation

Electronic access, distributed processing, teleshopping and flexi-working are encouraging a trend to de-massification, local control and individualised work patterns. The predicted growth in electronic cottage industries may be slower than originally envisaged, but the signs are nonetheless there. In time, patterns of work and social interaction will change as the liberating effects of the new technologies percolate throughout society.

Mystification

It is still the case that the majority of the population is informationally and technologically illiterate. The pace of developments in leading-edge organisations is so vastly different from the rate of absorption of the new technologies at the grass-roots level that the bulk of the population will be excluded from participation in the so-called 'wired society'. This situation may disappear in time; may be a generational problem, but this will not come about without considerable government-inspired initiatives and greater stimulation of the domestic market in terms of its use of public information services.

Transformation

Technology changes jobs. It also creates new employment opportunities. The introduction of gas lamps had an impact on the candle-making industry; the advent of the electric light bulb in turn had a negative impact on the gas-light industry. Technology clearly does eliminate jobs, but also (though not necessarily to an equivalent degree) creates new jobs and opportunities. Structural unemployment, however, would seem to be here to stay. The progressive mechanisation, automation and robotisation of work functions will continue to result in the displacement of labour.

Governments are faced with the challenge of finding alternative work, educational, or leisure opportunities for those dislocated by the introduction of the new technology. The new, flourishing high-tech industries are creating a new stratum of professional wealth. This further exacerbates the gap between the unwaged and the *nouveau riche*. How can this new wealth be redistributed in such a way as not to dissipate motivation and entrepreneurism, yet avoid inequitable distribution of national income?

Intensification

One of the effects of technological change has been the creation of a heightened information awareness throughout society, but especially within the business community and government itself. The realisation that information is an important personal, organisational and social resource, which can be capitalised, which has a market value and which requires effective management has begun to shift attention from the hardware to the content of information systems and the uses to which information can be put. The 'technocentricity' of the 1970s and early 1980s is, it seems, being counterbalanced by a new-found information awareness. Information may be intangible, but the market now recognises that information can, in some respects, be treated like any other commodity. It is, however, an unusual commodity: one which does not deplete on consumption, which can have multiple life cycles, which can be easily replicated or mass produced, which violates some of the basic rules of ownership, which can have positive externalities and which, perhaps most importantly, has the features of a social good. It is this last aspect which necessitates some form of government information policy or legislative framework to ensure that the rights of access of Everyman are protected in a free-market economy.

Commercialisation

Until recently information was almost invariably treated as an overhead expense. The real costs of generating, storing and retrieving information were rarely quantified. The introduction of computer-based information retrieval systems and the development of value-added services and networks, with their highly visible costs (subscription; volume-use; time and telecommunications costs; royalty payments; capital equipment costs; associated staff and training costs) has led to a fundamental change in outlook and budgetary practices.

The application of cost-accountancy and overhead value analysis techniques to the management of the information resource is slowly but surely becoming the norm. On the supply side, this intensifies the pressure for high-quality, added-value, real-time, exclusive information services. Producers and vendors are increasingly conscious of the need for perceived high quality services in an extremely volatile and competitive marketplace. 'Nichemanship' is the order of the day in the information industry.

A disbenefit of this situation is that public sector information utilities are less able to compete and may find themselves pushed to the periphery in the face of competition from private sector companies or cartels. Institutions, such as the public library, are ill-equipped to compete in the high-tech, high-cost information market, not simply because they lack cash reserves to launch new ventures, but also because they are not traditionally producers or generators of information. Traditionally, they have stored and showcased third-party products. As the penetration of computers into professional and domestic life continues, it is quite conceivable that information providers will choose, in some circumstances, to bypass the intermediary community and market their wares direct to the ultimate user/consumer. It would be in the interests of the population at large, if public sector agencies involved in the information supply business were to enter into partnership with commercial organisations in order to bring onstream new services and products to improve their revenue base. In a fully-fledged information society, great care and attention will need to be given to demarcating the lines between the public and private sectors, if one is not to stifle or overpower the other, thereby worsening the quality and range or services available to the less advantaged sections of society.

The information workforce

Since the publication of Marc Porat's landmark study on the composition of the US labour force[6], much has been made of the statistic that more than 50 per cent of the economically active in the US are information workers. The effect of this statistic has been to galvanise awareness and interest within and outside the academic community. Porat's figures have been questioned on the basis of the classification employed, but the effect has nevertheless been to bring about a perceptible shift in public appreciation. The term 'information worker' is now just about an accepted part of speech. In some respects, it is not that the information worker population suddenly and inexplicably multiplied many times overnight, but that our analysis of the core functions of many professions and occupations has highlighted the informational components.

In dissecting occupational roles, it is clear that a great deal of time is spent by a great number of people 'doing something to or with information'. Tangible, physical outputs are often not associated with contemporary work roles. Activity is cerebral (be it at a low or high level). Inputs and outputs are 'soft'. Just as it is legitimate to see many organisations as information-processing entities, so, increasingly, is it legitimate to see society as an information/knowledge processing organism.

The effective management of information flows, the creation of new ideas and knowledge, the promulgation of computer-enhanced human cognitive processing, the development of a strong information industry and improved marketing of value-added information systems, services and products will in the years ahead be the critical determinants of successful economic functioning.

The panoply of statistics, indicators and growth curves, for countries as different as the USA, Eire, Venezuela and Sweden reveal a consistent picture. The percentage of the workforce engaged in information occupations is rising; more specifically, greatest growth is to be found among information occupations in information industries. An exaggeration it may be, but information has the hallmarks of the new capital.

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Introduction

Aslib Biological & Agricultural Group seminar, 'Medical Statistics', Guy's Hospital Medical School, London, 29 November 1985.

> *Statistics are somewhat like old medical journals, or like revolvers in newly opened mining districts. Most men rarely use them, and find it troublesome to preserve them so as to have them easy of access; but when they do want them, they want them badly.*
>
> JOHN SHAW BILLINGS
> *Medical Record*, **36**, 589, 1889

For many librarians and information scientists who work in the biomedical field, medical statistics have long been a subject of taboo. The multitude of topics, profusion of sources, and variety of presentations, have succeeded in bemusing many and confusing a lot.

The meeting at Guy's was arranged with the aim of bringing together leading authorities in the subject who could dispose of the myths. Who with their experience and understanding could help with definitions, examples and evaluations. To this end therefore the programme aimed for a balance between theory and practicality. To indicate not only what statistics are collected, by whom and in what form they are made available. But also to offer the opportunity of gleaning from the experienced, what pitfalls to be aware of; merits and shortcomings of various sources; and when all else fails, who to contact.

The large number of delegates reflected both the importance of the subject and high regard felt for the speakers. They also contributed to lively discussion, and by the end of the day a certain amount of reassurance had been gained. For it became apparent that the difficulties in providing answers to statistical queries need not necessarily lie in (a) an inadequate stock of sources, or (b) the inefficiency of staff. But rather with a lack of central collection, and the resulting disparity of coverage at present offered.

JUNE HAYLES
Aslib Biological & Agricultural Sciences Group

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Statistics for the economics of health care

Nicholas Wells
Associate Director, Office of Health Economics, London

Paper presented at the Aslib Biological & Agricultural Group seminar, 'Medical Statistics', Guy's Hospital Medical School, London, 29 November 1985.

Statistics for the economics of health care encompasses three enormous subject areas in their own right. In order to make my task more manageable, I have decided not to say very much directly about statistics, as Dr. Alderson of the Office of Population Censuses and Surveys, and Dr John Fry, leading authorities on mortality and morbidity statistics – which are of course essential data in studying many health issues, have given papers at this seminar[1]. Instead, I shall concentrate on the remaining two, economics and health care and in so doing divide my paper into two parts. The first will look at the evolution of health economics and then I shall turn my attention specifically to the work of my own organisation, the Office of Health Economics (OHE).

Economics is concerned with getting better value from the deployment of scarce resources. Given this definition it is therefore of little surprise that there has been a growing interest in health economics, for in recent times two major sets of factors, each with enormous significance for the provision of health care, have been pulling in opposite directions. On the one hand, National Health Service funds have risen only relatively slowly in real terms over the last few years. The slowdown in the rate of economic growth since the oil crisis in 1973 and the erosion of the economic base from which health and social programmes are financed have placed major constraints on the funds available for health care. Clearly, we are now a long way removed from the 1960s when national economies were expanding rapidly and more health care was seen as one of the rewards of growth, like more cars and more television sets.

But today at the same time as the supply of funds for the National Health Service (NHS) is becoming ever more constrained, the costs faced by the system are rising inexorably. Technological developments in medicine have substantially increased costs because they often involve more expensive procedures and because they increase the patient population who might benefit from treatment. In addition, the costs of providing care have escalated, and will continue to do so, because of demographic changes, the most notable of which is of course the ageing of the population.

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Against this background of growing imbalance between the supply of, and demand for, health care resources, economists are therefore increasingly involving themselves in health care issues. But recent developments have not been the cause of economists entering into the health field. Economists were in fact becoming interested in the subject of health care during the 1950s. In those days much discussion focused on such issues as whether or not health care should be regarded as different from other commodities.

Following these early philosophical beginnings an economic input to the analysis of health issues has increasingly been sought because economics provides a framework which enables the merits of alternative courses of action to be systematically compared and quantified. It should be emphasised, however, that economics is decision-aiding and not decision-making. Nevertheless, economics has undoubtedly made a major contribution to policy planning, the appraisal of capital schemes and resource planning. In the case of the latter, economists contributed to the construction of the formula devised by the Resource Allocation Working Party, set up by the Department of Health and Social Security (DHSS) in the 1970s, which advocated that regional allocation of resources should be based on the relative needs of the different regions.

In recent years, economists have also increasingly involved themselves in assessing the costs and benefits of treatment alternatives. The fundamental reason for this development is that there are not and never will be enough resources to enable the community to pursue all of those objectives it considers desirable. Consequently difficult choices have to be made. Hitherto, 'decisions in the health care field have too often been made on the basis of one option being more beneficial than another – irrespective of cost – or being cheaper but disregarding relative benefits . . . Because of scarcity and the fact that more resources devoted to one activity means less devoted to another we can, and indeed should, think of costs in terms of benefits sacrificed for the best alternative use of the resources concerned[2]'. This is the economist's concept of opportunity cost and lies at the heart of the discipline. For example, it focuses attention on the fact that the real cost of an uncontrolled use of high technology diagnostic aids may be that community services for the elderly or mentally handicapped are foregone.

Economic appraisal takes several different forms, the most basic of which is straightforward cost analysis. Here the objective is simply to compare the costs of different treatment options. This 'simplicity' does not however mean that important methodological issues do not arise. It is for example relevant to establish the viewpoint from which the costs are being assessed and indeed when they are borne since individuals are not indifferent to the time profile of costs and benefits.

A more complex means of appraisal is cost-effectiveness analysis. The essence of this approach lies in asking the question what is the least-cost way of achieving a given level of benefits or, alternatively, how can we gain maximum effectiveness from a given level of expenditure. A good example of cost-effectiveness analysis is a study comparing forty-eight-hour post-operative stay for patients with hernia and varicose veins with the more traditional post-operative inpatient stay of seven days[3]. This appraisal was linked to a ran domised controlled trial, and showed that there was no significant difference between the alternative approaches in terms of clinical effects or patient attitudes. Overall, the short-stay method was shown to be more cost-effective but the difference was smaller than expected (when all the non-hospital costs were added in). It was, however, further pointed out that a policy decision to select the more cost-effective short stay option might in fact increase NHS costs if the beds thereby released were then employed to treat other patients.

Cost-benefit analysis is a yet more sophisticated means of economic appraisal. It involves identifying and measuring all the relevant costs and benefits over the life of a given programme, expressing them in money terms and discounting them to present values. Following this process, if the benefits are found to exceed the costs, there is then a prima facie case for proceeding with the programme. Should there exist a number of programme options, the approach would be to subject each in turn to the cost-benefit process outlined above and then choose the one with the highest net benefits. This type of economic appraisal might, for example, be employed to help decide the appropriate balance between institutional and domiciliary care for the elderly.

Yet even the degree of sophistication inherent in cost-benefit analysis falls short of the ideal. In the context of assessing treatment alternatives, criteria for success have traditionally included measures such as complication and recurrence rates and the volume of sickness absence before return to work. It has, however, become increasingly clear that exercises in evaluation need also to take account of the impact of therapy on the quality of life for the patient, that is, its impact on physical, mental and social functioning. At the same time there has been increasing awareness that patients' views on the desirability of given treatments may differ from those of their doctors. In this context a notable research exercise reported at the start of the 1980s[4], found that 20 per cent of a group of healthy volunteers would choose radiotherapy rather than surgery for laryngeal cancer even though the survival rate at three years for radiotherapy is approximately half that for surgery. Surgery severely impairs speech and these individuals judged quality of life to be more important than longer survival.

In summary, the objective of economic appraisal is to ensure that as much benefit as possible is obtained from the resources devoted to health care. This involves examining the benefits and costs of given options. The former are measured in terms of the effect on life expectancy adjusted for the quality of life. The costs that need to be taken into account include those borne by patients and their families as well as those falling on the health service. Procedures might then be ranked so that activities generating more gains to health for every pound sterling of resources should take priority over those yielding less.

Professor Alan Williams, one of the country's leading health economists, has recently undertaken an exercise of this nature in the context of coronary artery bypass grafting[5]. In an assessment of the cost per quality-adjusted life year gained, coronary artery grafting rated well for cases of severe angina and extensive coronary artery disease. For these indications bypass grafting seemed to compare favourably with valve replacement for aortic stenosis and implantation of pacemakers for heart block; it was shown to be distinctly better value than heart transplantation and the treatment of end-stage renal failure but it was found to be less cost-effective than hip replacement.

Inevitably, despite the caveats that were offered with their presentation, these controversial findings, drew a critical response from some quarters when they were published in the *British Medical Journal*[6]. But economists are used to their work being greeted by varying degrees of hostility. This observation may be illustrated by quoting Loewy from the prestigious *New England Journal of Medicine* in 1980[7].

> 'Of late an increasing number of papers in this and other journals have been concerned with "cost-effectiveness" of diagnostic and therapeutic procedures. Inherent in these articles is the view that choices will be predicated not only on the basis of strictly clinical considerations but also on the basis of economic considerations as they may affect the patient, the hospital, and society. It is my contention that such considerations are not germane to ethical medical practice, that they occupy space in journals that would be better occupied by substantive matter, and that they serve to orient physicians towards consideration of economics, which is not their legitimate problem. It is dangerous to introduce extraneous factors into medical decisions, since consideration of such factors may eventually lead to consideration of age, social usefulness, and other matters irrelevant to ethical practice. The example of medicine in Nazi Germany is too close to need further elucidation'.

Of course this represents an extreme position and it is increasingly being recognised that if there are insufficient resources to do all that is technically possible then medical care must be limited to procedures of proven value. Thus Professor Bryan Jennett in his recent Rock Carling Monograph[8] on high technology medicine called, among other things, for more economic appraisal that compares new innovative procedures with their alternatives and also ranks them with technologies for other conditions. And, more generally, the cardiologist Professor John Hampton has recently written that clinical freedom – the right of doctors to do whatever in their opinion was best for their patients – is at an end. To quote the concluding paragraph of his leading article in the *British Medical Journal*:[9]

> 'Clinical freedom died accidentally, crushed between the rising cost of new forms of investigation and treatment and the financial limits inevitable in an economy that cannot expand indefinitely. Clinical freedom should, however, have been strangled long ago, for at best it was a cloak for ignorance and at worst an excuse for quackery. Clinical freedom was a myth that prevented true advance. We must welcome its demise, and seize the opportunities now laid out before us'.

In the foregoing I have attempted to present a very general view of the sorts of fields in which health economists are currently working. I would imagine, however, that medical librarians would be particularly interested in how to find out further details about their activities and in this respect the principal source of information is the Health Economists Study Group (HESG).

Practically every health economist in the United Kingdom – those working in universities, for the Economic Advisers Office of the Department of Health and Social Security, for regional health authorities, or in other relevant settings – belongs to this group. Membership also comprises a fair number of health economists working in a wide range of European nations.

The group meets twice a year to discuss, among other things, research work in progress. Frequently the papers presented to their meetings are subsequently published in relevant journals, notably the relatively-recently introduced *Journal of Health Economics*. However, one of the most useful documents to come out of the HESG is its annual compendium, entitled *Health economists' activities, research and teaching* – better known by its acronym HEART. This volume is constructed from the replies to questionnaires sent to all HESG members requesting information about current research interests. It is a comprehensive and extremely valuable source document.

The HESG is run from York University which in addition houses the joint Economic and Social Research Council/DHSS sponsored Centre for Health Economics. The University also runs a postgraduate course in health economics. Despite this apparent monopoly, York does allow other universities to enter the health economics market! In this context mention should be made of the Health Economics Research Unit at Aberdeen which in addition to academic research also runs a correspondence course on health economics for NHS administrators and other personnel. Then there are the Health Services Management Centre at the University of Birmingham and Brunel University's Health Economics Research Department which was responsible for the recently-published study of the costs and benefits of cardiac transplantation. In addition, there is of course the Office of Health Economics.

OHE was founded in 1962 by the Association of the British Pharmaceutical Industry. Its formal terms of reference are to:

- undertake research on the economic aspects of health care;
- investigate other health and social problems;
- collect data from other countries;
- publish results, data and conclusions relevant to these studies.

These publications take a number of forms but the series for which OHE is undoubtedly best known is that concerned with current health care problems. Almost eighty booklets in this series have been produced since 1962. Some of these provide broad philosophical analyses of the changing nature of demand for health care and the problems to which this process has given rise in the face of ever-pressing resource constraints operating on the supply side. Others have described and commented on the logistics of health care delivery, with particular emphasis of course on the National Health Service. The majority of the papers in this series, however, have been concerned with specific causes of ill-health. Thus OHE's first report examined tuberculosis. One of the most recent publications looked at what may in some ways be regarded as the contemporary successor of tuberculosis – coronary heart disease. In the two decades or so separating these two publications, pneumonia, venereal disease, diabetes, epilepsy, arthritis, multiple sclerosis and most recently back pain, among many others, have been the subject of OHE's attention. Yet in spite of the diversity of the subject matter under investigation one central aspect has commanded attention throughout – the economic and social sequelae of disease.

In each of its analyses OHE has attempted to quantify the costs that disease imposes upon society. In order to do this it has adopted a number of approaches and in briefly outlining these I shall indicate some of the sources of statistical information that it draws upon.

One of the classic measures of the economic significance of disease is sickness absence from work and OHE has examined this as a topic in its own right on several occasions. Prior to legislative changes effective in the early 1980s, payment of national insurance contributions by employees and their employers conferred upon individuals the right to claim state benefit payments to compensate for any loss of or drop in earnings during sickness. Entitlement to claim was dependent upon the acquisition of a certificate signed by a doctor confirming incapacity for work. Each year a sample of these certificates was selected and analysed by the Department of Health and Social Security and information relating to spells and days of absence by cause and various claimant population characteristics – age and sex – has been published.

In addition to these data, DHSS also publishes figures showing the cost of meeting sickness benefit claims each year. Consequently, it is possible to calculate the average daily cost of sickness benefit and hence the burden generated by any particular disease. Thus DHSS data indicate that there were 361 million days of certified incapacity in Britain in 1982–83 which cost the national insurance fund almost £2·1 billion. It may be calculated, as an illustrative example, that the 33·3 million days of absence due to various forms of back pain gave rise to sickness benefit payments totalling £193 million in 1982–83.

Inevitably such statistics suffer a number of important limitations so that care must be exercised in their use. For example, spells of absence lasting three days or less were generally excluded from the statistics since benefits were not normally available for such short-term absences. Shortfall also stemmed from the fact that approximately half of the married women who work exercised their right to opt out of the national insurance scheme and so their spells of absence were not recorded. With similar effect a number of other groups such as non-industrial civil servants, employees of the Post Office and members of the armed forces – together totalling nearly one and a half million individuals – were partly or wholly outside the scheme. To some extent these and other factors were, however, counterbalanced by the overstatement of sickness days implicit in the fact that DHSS data were based on a six-day working week.

Qualitative deficiencies also exist alongside these quantitative shortfalls. The medical cause of incapacity recorded on the doctor's certificate, for example, is in many instances a reflection of the information imparted by the patient about his or her symptoms rather than any specific or verifiable diagnosis. Even when there is an identifiable medical component little can be gleaned about severity: the timing of return to work may be influenced by factors other than the termination of ill health. In spite of these considerations the data were clearly valuable in facilitating calculations of the cost to the Exchequer of certified incapacity from particular causes.

However, such sickness benefits are transfer payments and economists do not, therefore, regard them as conventional costs. It is of course true that the distribution of such funds does have an opportunity cost, that is it precludes their allocation to other areas of private and public expenditure. But the true economic significance of certified incapacity for work is represented by the value of potential output that is lost and this may be estimated approximately by applying earnings' data to the number of certified days of absence. Thus, returning to the example of back pain, on the basis of the average levels of remuneration prevailing throughout all manufacturing and service industries in 1983, back pain may be calculated to have deprived Britain of output worth £1 billion in 1982–83.

Yet even this calculation is open to question. It may be argued for example, that £1 billion is an understatement because, as noted above, absences of very short duration and 'producers' who remain outside the sickness absence system, such as housewives, are not taken into account. Conversely, the methodology employed may overstate the true level of loss if work teams are able successfully to reorganise to accommodate the temporary absence of one of their members through back pain. In addition, estimates of production loss may be perceived as more notional than real in straitened economic circumstances in which high levels of unemployment prevail.

Hospital costs have been another area of major interest to OHE in its evaluation of the financial impact of disease. Indeed, expenditure on hospital care has received considerable attention from health economists and the reason is readily apparent: the hospital services have, since the inception of the NHS, consistently absorbed approximately three-fifths of the service's total resources.

One of OHE's concerns in this field has been to establish the proportion of the total hospital bill that may be attributed to specific diseases. Again the data are readily available and the methodology straightforward. In England, the hospital in-patient enquiry (HIPE), which is based on a 10 per cent sample of non-psychiatric hospitals, yields data on admissions, lengths of stay and other variables by diagnosis and patient age and sex. In addition, the DHSS also publishes health service costing returns which detail the expenditures generated by hospital in-patient care. Thus to take once again the example of back pain, the HIPE indicates that in 1982 there were 65,572 admissions for the disease and that each admission lasted for an average of twelve days. This yields a total hospital stay of 783,000 bed days. If it is then assumed that hospitalised cases are treated in acute hospitals with fifty-one or more beds, an average cost per in-patient day of £75 emerges from the health services costing returns for 1982–83. Bringing the two figures together indicates a hospital in-patient cost for back pain of nearly £60 million.

Once again, figures relating to the costs of hospital care suffer a number of drawbacks. There is, for example, little information about the costs surrounding the in-patient spell. Out-patient consultations leading to hospital admission and providing for subsequent follow-up are available only in highly-aggregated form and cannot be linked to specific in-patient episodes. This also applies to other services such as those involved in patient rehabilitation. But perhaps the principal problem lies in the fact that the costing figures are once again averages. In some cases, such as coronary heart disease for example, such averages must lead to a clear understatement of the true level of costs. Heart disease patients admitted to medical wards may require a greater number of particularly costly diagnostic tests, closer and prolonged surveillance and more expensive pharmaceutical therapy than patients in other specialities. On the surgical side, coronary artery bypass grafting requiring preliminary investigative arteriography and subsequent intensive care, probably generates per capita hospital case costs which are markedly under-represented by the averages shown in the published health service costing returns.

Turning to the costs of primary medical care, OHE has adopted an approach which is broadly analogous to that employed for the hospital sector. Information is readily available concerning the total cost of the service – from the Department of Health – and this may be linked to a number of data sources showing the extent of the demands that are placed on the service. For example, the *General household survey*[10] indicates that in Britain in 1982 males and females consulted their general practitioners (GPs) 3·5 and 5·0 times respectively. Application of UK population data to these rates yields a total of 241 million consultations for 1982. Now given that the cost of the general medical services – that is, the services provided by family doctors – amounted to £1,003 million in 1982 it may be calculated that, on average, each consultation with a general practitioner cost £4.16 in that year.

Of course, the total cost of treatment in general practice should also take account of the prescription of pharmaceuticals. In 1982 the cost of the pharmaceutical services – including dispensing fees as well as drug ingredient costs – amounted to £1,469 million. This sum implies a pharmaceutical cost per consultation of £6·83. Thus the total expense generated by a GP consultation in 1982 may be calculated to have been £11.

More often than not, however, the information required is the health care costs attributable to specific diseases. In this case, use is made of the Second National Survey of Morbidity in General Practice which was conducted in 1970–72[11]. Clearly this study is now somewhat dated but until the results of the 1981–82 survey are published it remains the most detailed source of information currently available. The approach adopted is to estimate what proportion of the general practice workload – as measured by consultations – is attributable to any given disease and apply this proportion to the total cost of the general medical services.

Specific pharmaceutical costs are more difficult to ascertain. The DHSS makes available each year information showing the number of prescriptions dispensed and their net ingredient cost – that is the cost of the drug itself which does not include the fees paid to pharmacists for their services. However, the data are presented by therapeutic rather than diagnostic category. This does not matter if we are interested in, say, epilepsy because all of the prescription costs attributable to anti-epileptic preparations are relevant to the treatment of this condition. But with something like back pain the costing of drug therapy is more difficult. The prescription cost data are insufficiently specific – that is, they do not identify prescriptions written and dispensed for back pain. Instead, the data only refer to broad groups of drugs – the relevant ones in this case being of course analgesics and non-steroidal anti-inflammatory preparations. So how do we arrive at an appropriate cost estimate? In OHE's recent booklet on back pain published in 1985, the approach adopted was to assume that each general practice consultation – known from the morbidity survey – resulted in a prescription for four weeks medication. It was then possible to calculate the cost of the volume of drugs that this would involve on the basis of the average price of non-steroidal anti-inflammatory drugs in *MIMS (Monthly Index of Medical Specialities)* – one of the general practitioner's reference books on pharmaceutical products.

It was recognised of course that the accuracy of the estimate thus derived was open to question. It may, on the one hand, have overstated the true cost of chemotherapy prescribed by general practitioners. This possibility arises for several reasons: not all patients may receive medicines for their back pain; the average duration of drug therapy may be less than four weeks; and prescribing patterns for back pain may favour analgesics rather than non-steroidal anti-rheumatic (NSAI) preparations and analgesics, in terms of average net ingredient cost per prescription, incur only about one third of the expense of the NSAI drugs.

On the other hand, the methodology may have understated the true cost because it excluded spending on various other medicines and appliances employed in the treatment of back pain – muscle relaxants, steroid and anaesthetic injections, anxiolytics, anti-depressants and spinal supports. This effect might also have occurred if a significant number of patients require chemotherapy for a longer period of time than four weeks. In the absence of further information it simply has to be accepted that the impact of these two sets of factors remains unknown.

These then are the types of costing that OHE has incorporated into its studies of health care problems. The question might be asked why such costings are considered worthwhile. There are a number of reasons. First, by converting the various impacts of a specific disease to one common, that is financial, form it is possible to gain some impression of its overall burden which can then be judged in relation to other causes of ill health. In theory this might offer clues to the priority that ought perhaps to be given to resolving the morbidity and mortality associated with different disease entities.

Secondly, OHE has shown in its use of these measures that pharmaceutical expenditure is frequently only a minor element in the cost of disease, and by broad extension, that the cost of the nation's drug bill, when seen in perspective, is not as excessive as some critics have claimed. And finally OHE's costing exercises have demonstrated that pharmaceutical progress can generate significant economic benefits for both the NHS and the national economy as a whole.

I have spent some time describing the disease costing procedures adopted by OHE but would emphasise that in reality such exercises constitute only a small part of its work. It draws upon an extremely wide range of information sources – epidemiological, aetiological and therapeutic data as well as official policy documents and commentaries upon them – in examining health care issues. Its aim in producing its reports has been and continues to be to inform debate in the health care area.

Of course it is not for me to judge how successful it has been in its endeavours. I should therefore like to quote Dr Donald Gould, the medical journalist who wrote in his book *The black and white Medicine show*[12]:

> 'OHE has fulfilled its brief with distinction and every three or four months for the past twenty years the office has produced an objective, well-documented, literate, and attractively presented booklet encapsulating the known facts about subjects ranging from suicide and rabies and heart disease to the cost of running hospitals and what the public expects from the NHS, always adding a few percipient comments and conclusions of its own for good measure. The office also produces fact sheets, statistical tables, and monographs on the economics and logistics of health care, and on various issues affecting the pharmaceutical scene. This activity has earned the gratitude, and, indeed, the respect, of many people with an interest in medical affairs, including journalists, who have come to rely upon OHE's publications as accurate and wonderfully lucid source material'.

I have in fact been somewhat unfair to Gould by not putting his words into their original context. In describing OHE's virtues he was in fact developing his assertion that the Office of Health Economics is 'perhaps the most brilliantly successful of the drug makers' public relations exercises'. He argues that although OHE has created 'a fund of goodwill for the pharmaceutical industry . . . there is in addition, and as usual, a less obvious, but no less important dividend which the industry extracts from its investment in OHE.[13]' He goes on to explain, 'Every now and again the office produces a propaganda document, couched in the familiar OHE format and terms, full of arguments designed to promote the industry's aims of selling more drugs for more money with the minimum possible let or hindrance from interfering politicians and government officials[14].

His thesis is that arguments supporting the pharmaceutical industry would immediately be dismissed if put forward in say the Association of the British Pharmaceutical Industry's newsheet *(ABPI News)* but 'when they are propounded in a thoughtful quasi-academic, treatise from that nice Office of Health Economics – ah well, that's somewhat different. We might not agree with it, mind you. But it has to be thought about, doesn't it? The seed has been planted[15]'.

I have not referred to Gould's comments in order to reply to such views about the role of OHE. Instead I have simply employed them to introduce the final facet of the work of OHE: that is its role as an information centre about the pharmaceutical industry in Great Britain. Every couple of years or so it updates its basic source document entitled the *Pharmaceutical industry and the nation's health.* It is a compendium of facts and figures about the industry, providing information on, for example, output, the size of the home market, international trade, employment, NHS spending on medicines along with many other topics.

In addition to this publication it has examined in some detail the past trends and future prospects in drug innovation and a paper is currently being prepared which examines the question of financing medical research – funded not just by the pharmaceutical industry but by charitable bodies and the government via the Medical Research Council and the universities.

Finally, the pharmaceutical industry is of course a multi- national enterprise and in 1985 OHE published *Pharmaceuticals in seven nations* which examines the world's most successful pharmaceutical countries. Apart from what might be termed the philosophical arguments, the booklet contains a wealth of information relating to the industry's activities in the seven nations in question which the OHE was able to put together by drawing on the extensive network of international contacts it has built up over the years.

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TOOLS for the TRADE

Translating and the Computer 5

Edited by
VERONICA LAWSON

Proceedings of the Fifth Translating and the Computer conference
10–11 November 1983, The London Press Centre

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Problems in using medical statistics

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Transcript of a talk given at the Aslib Biological & Agricultural Group seminar 'Medical Statistics', Guy's Hospital Medical School, London, 29 November 1985.

Introduction

I work at the National Perinatal Epidemiology Unit which is a Department of Health and Social Security (DHSS) funded multidisciplinary research unit. We have a strong view that before collecting new data we should use the data which already exist. As a result, both our economist and I make very extensive use of official statistics.

I am meant to be talking about the problems which arise in using these statistics. The question of why there were so few morbidity statistics has been discussed by Dr Alderson[1], and to help explain why this is so, I am going to stand back for a moment and look at what we mean by statistics.

Morbidity statistics – why are they in such short supply?

The word 'statistics' came from the word 'state' and the *Oxford English dictionary* tells us that one definition is, 'In early use that branch of political science dealing with the collection, classification and discussion of facts bearing on the condition of the state or community'[2]. Of course the areas which statistics cover have widened quite a lot from politics but we certainly hear quite a lot of statistics from politicians of different colours talking about the health service these days. The second definition describes the numbers themselves: 'Numerical facts or data collected and classified'[3]. I don't think facts is quite the word I would use, though, as it has an apparent feeling of objectivity which is, perhaps, artificial.

Many of the data that we use date from about the mid-19th century and we have heard about mortality statistics from Dr Alderson[4]. The first person who did his job and set up the system of analysing birth and death registration statistics was William Farr and he had a lot to say about the statistics. He was one of a number of people at that period interested in statistics as a political science and in reforming society in general and public health in particular. He pointed out that 'the registration of births and deaths proves the connection of families, facilitates the legal distribution of property and answers several other public purposes which are sufficient to establish its utility[5]. In other words

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it had a legal and administrative purpose but 'I have to examine the registration from a different point of view'[6]. He was interested in using death registration statistics for what he called 'practical medicine' to see how disease varied in different parts of the country at different times.

Many of the official statistics that have been described at this seminar are the by-products of an administrative system. This can either be a system for establishing identity or death, as does birth and death registration or a system for administering the use of services or payment of benefits, which only includes the numbers of people who actually get to the doctor or get to hospital or are entitled to claim benefits and are successful if doing so. This in a sense explains some of the gaps and duplications we get. Our so called morbidity statistics are very much related to contact with doctors and other health service staff. So however good they are at collecting and recording information about their patients, unless the patient has actually established contact with them they can't start recording information. Similarly problems arise when taking the extent of treatment in hospital for certain conditions as a measure of illness in the population. In fact, you are not directly measuring the illness in the population. Instead you are measuring how many people had got to hospital and were diagnosed as having that condition. There may be unnoticed and undiagnosed illness in the population which will not appear in statistics. You also get a certain amount of duplication in the collection of statistics. For example when a baby is born, parents register the birth with the local registrar. The midwife also notifies the birth to the health authority and that is then passed on to the health visitor who has a statutory duty to visit the baby after birth. So they are both serving two administrative purposes.

If you want to collect information about illness and disability in the population you actually have to go and ask people and there are quite a lot of problems. One of the things that we don't have is comprehensive statistics about disability because many disabled people do not get benefits or special services.

This is something that has again been recognised since the 19th century when it was thought that the census might provide a way to collect information about disabilities, or infirmities, as they called them at the time, and they had these sort of problems for example:

> 'particularly in the case of the deaf and mute there was under-reporting in the condition in children under five years arising from the uncertainty which must exist in respect of infants and the natural indecision of parents to form the painful conclusion on the subject while the slightest grounds for doubt exist'[7].

In our unit we have people who are trying to collect information about disability in young children and they have the same problems of diagnosis. Even if the parents are worried, there is still the question whether it is possible to make a definite medical diagnosis. Sometimes the child appears to have a problem and then it goes away again. In contrast to this, a problem which had its origins at the time of birth may not in fact manifest itself until later. Indeed if a problem becomes apparent later it may be unclear whether its origin is to do with what happened when the baby was born or with something which occurred long before or long after the time of birth.

Further problems arise when there is some stigma attached to the illness or disability. The 1851 census was the first census in which attempts were made to collect information about infirmities but it was collected only about deaf and mute people. From 1871 onwards attempts were made to collect information later on about mental illness and mental handicap about which there was some stigma. As the report of the 1891 census put it 'parents cannot be induced to write on a schedule "Idiot" or "Insane from childhood" against the name of their child'[8]. Even though we have more muted or euphemistic words now, I don't think the social stigma is any less worrying than it was in 1891. Anyway this attempt to collect morbidity statistics was given up in 1911 as it was felt that the information was not very reliable.

Moving forward to 1946 when people were looking ahead to the setting up of the health service, the annual report of the chief medical officer of the Ministry of Health said,

> 'The absence of reliable national statistics of the incidence of sickness and of injuries other than those which can be derived from notifications and death certificates, and which cover only a limited field, became an embarrassment during the War and efforts were made to close some of the gaps in our knowledge of the state of the public health'[9].

In tackling this problem, the things they looked at at the time were firstly extending the International Classification of Diseases, which up to then referred to deaths, to injuries, so that it could be used in, amongst other things, the system which later became the hospital in-patient enquiry about which I will say a little more later. At the time there was a survey of sickness in which people were interviewed and asked about what illnesses they had suffered from. Ironically, that was dropped not long after the start of the health service, though similar questions are now asked in the *General household survey*. It was felt necessary to improve the notification of infectious diseases which provided a set of statistics which went back to the mid-19th century. It was also felt desirable to improve sickness/absence statistics which, as has been mentioned at this seminar, are now virtually unusable and also cancer registration which is now being improved in some regions. It was said at that time and this links in with what was said earlier at this seminar, 'It is not possible now and even when the National Health Service is fully developed it may never be possible to envisage the derivation of national morbidity statistics from a single source of information'[10].

One of the things that impeded this before the health service was set up was that there were different bodies administering the health services which were available at the time, either local authorities or voluntary associations. Even now the growing private sector is not included in national statistics and seems to collect rather fewer statistics than the National Health Service (NHS).

One of the things that was mentioned earlier on was the question of linking data collected about people throughout their life and one way to do this is via the National Health Service Central Register. This contains a record for everyone of us who is registered with a NHS doctor and it is potentially possible to use it to collect more information than is collected at present. Some information is collected. For example if someone is diagnosed as having cancer that is recorded but as Dr Alderson[11] pointed out there is medical resistance to keeping information centrally and this makes national record linkage difficult. There are of course local systems, like the Oxford Record Linkage Study, which have attempted to pull together information from different sources but there are a lot of technical problems involved.

Sometimes where there are no statistics people will make them up. Very often these are nice round numbers. I call them magic numbers because they tend to be repeated many times in the press. It was suggested that there were almost too many data about perinatal problems but the question we are always being asked is about how many babies are disabled because of things that happen at or about the time of birth and nobody knows. Yet it has been claimed that '6,000 newborn babies could be deprived of intensive care they need in 1985 because of the shortage of cash and facilities'. This comes out of *Labour's charter for the health service*[12] which contains various other slightly dubious statistics without dates so we don't know which year they apply to. I rang up the Labour Party's Research Department and asked where the number 6,000 came from. They said it came from a *Guardian* press cutting[13] which had been lost! I later found it in my own collection and read that it was quoted by a senior paediatrician who did not want to be named . . . So watch out for those.

One of the things that happened as the health service became established was a change of emphasis towards collecting information about the service itself. As the chief medical officer's report for 1949 put it,

> 'The unification of the hospital and specialist services has made both possible and necessary the introduction of a uniform set of returns designed to keep the Minister and the Hospital Boards accurately informed of the amount and range of facilities at their disposal and the use being made of them'[14].

About this time was the Rayner *Review of government statistical services.* It looked into what statistics were being used for. Its report on the DHSS said,

> 'Some policy branches were reluctant to express a view on the statistical information they required other than they were not prepared to relinquish that which they had. Some users neither knew nor cared about the appropriateness or the timeliness of the figures they received. Some statisticians did not know either their customer or the use to which their figures were being put'[15].

The result of that review was a twenty-five per cent cut in the government statistical services[16] rather than improvements.

Health service statistics were exempted because they were being reviewed by the Korner Committee which found very similar things. 'Though much lip service was paid to the crucial and central importance of high quality statistics, few health authority management teams or heads of department currently analyse data expertly, present them informatively or use them intelligently in the performance of their management task. Despite certain acknowledged inadequacies of NHS data systems far greater use could be made of existing statistics'[17]! Earlier on in the seminar somebody said that implementing the Korner recommendations might give us better data about morbidity. I am not too optimistic since 'the Steering Group's main concern is with information for health services management. Thus we have not tackled specifically information needed by health professionals to evaluate the results of their care; nor that needed by individual professional bodies to review the resources available to and the professional work of their members. An exception to this working rule is maternity services and because of the interest and involvement of the relevant professional bodies, recommendations have been made about clinical data items to assist clinicians in reviewing the process of care'[18].

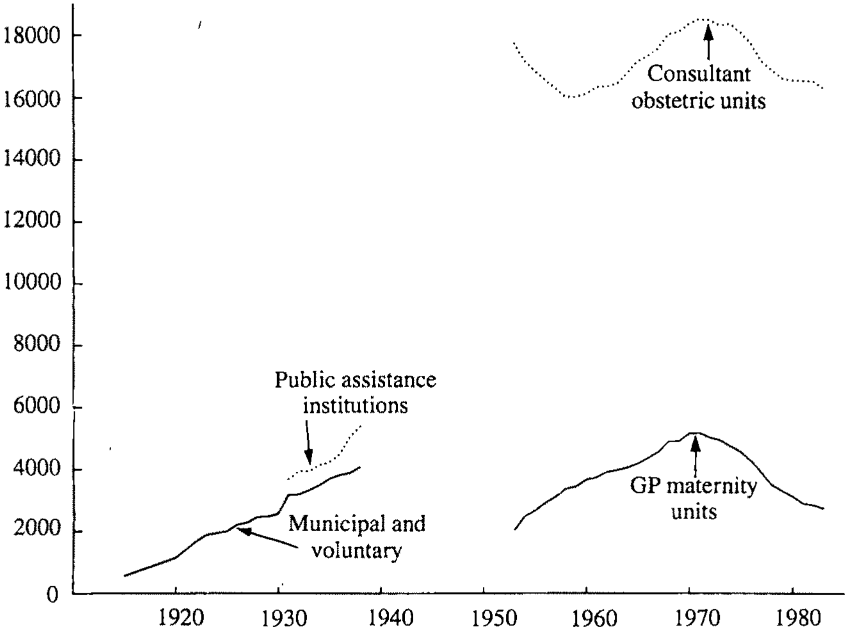
It remains to be seen what will happen but the system should provide better management information than is available now and it will mean that the data which are currently sent in on separate returns – say about staff or about hospital discharges will be more integrated.

The Steering Group has published six reports now of what is going into their system and they are piloting it. I have yet to see any reports about what information is coming out. There is some mention about word-processor disks suggesting that it may be like the performance indicators where you have to have the right brand of microcomputer to use them and DHSS specifically say that these indicators may be useful to you 'if you are a manager or assist one'[19].

Problems in finding data

What happens when you are trying to look for data? For example I want to update the Figure 1 series showing the number of maternity beds in England

FIGURE 1. *Numbers of maternity beds, England and Wales,* 1915–80.



Source: Ministry of Health, DHSS and Welsh Office.

and Wales over quite a long period and the data from the era before the health service are different from those collected now. I also want data for recent years split down into consultant obstetric units and general practitioner (GP) maternity units.

Obtaining the past information meant going through many different publications. The data from before 1918 came from the *Annual report of the Local Government Board* and that covered England and Wales. Data from 1918 to 1968 came from the *Annual report of the Ministry of Health* which included the chief medical officer's report for England and the report of the Welsh Board of Health. Then for three years, most statistics were taken out of this and put in a publication called the *DHSS digest of health statistics in England and Wales.* In 1972 this became *Health and personal social services statistics for England and Wales,* and from 1973 onwards the two were split.

Health and personal social statistics for Wales continues to be published, though it is no longer available through HMSO. It is published by the Welsh Office. The volume for England became somewhat intermittent. The series stopped in 1978 and then there was a volume published in 1982.

A Parliamentary question was asked about why it had not been published in the other years. The answer was,

> 'The 1978 edition of Health and Personal Social Services Statistics was published in 1980. Subsequently the publication was put on an ad hoc rather than annual basis and a further volume was published in 1982. The possibility of further publications in this series is under consideration'[20].

A further reply to another parliamentary question at the end of July said that a 1985 edition was due out shortly[21] but it hasn't yet appeared. (It did appear – see postscript.)

As Dr Fry mentioned this is the major source of most of the statistics about the health service in England. Of course we now have rather glossier publications, which I will say more about later, and which have better graphics and far fewer data.

Going back to the Rayner *Review,* it is perhaps not surprising that Sir Derek (now Lord Rayner) was anxious that 'government information statistics should be collected primarily because the government needs it for its own business', and the DHSS *Report* said 'few people within the Department suggested to us that the Department had any obligation to publish information'[22]. The Office of Population Censuses and Surveys (OPCS) gave a rather different answer, 'publication is an effective way of disseminating information once published information is readily available'[23].

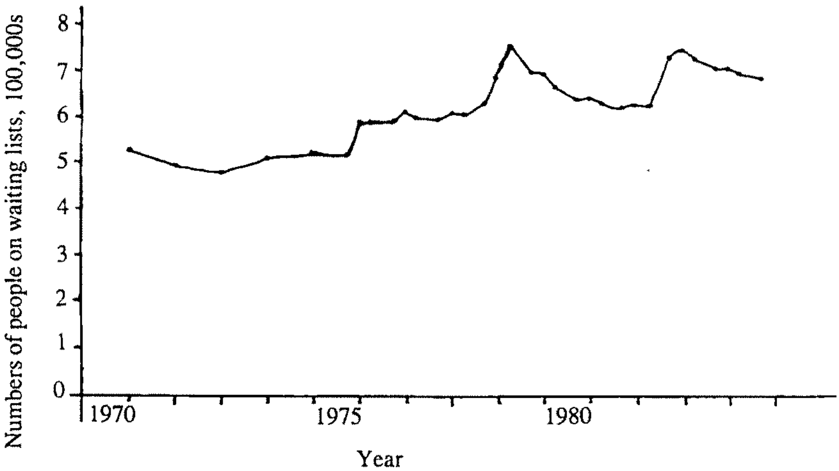
I think this is important because if we want to have a sensible debate about health care in the UK, and people are worried about it, the information not only needs to be available to professionals, but also to the public, pressure groups and community health councils.

Some information you won't find even in OPCS's excellent publications. For example you may want to know the number of times hypothermia is mentioned on death certificates. Although this will be published, I understand, from 1986, at present the only place this information can be found is in *Hansard* as parliamentary questions are asked on the subject about this time of year (November). *Hansard* often has statistics which are not published elsewhere and particularly since the non-publication of *Health and Personal social services statistics for England,* there have been parliamentary questions about the data that haven't been published. Of course unless you are in a library that keeps *Hansard* this is not much help. It may be that like our Unit you subscribe to a *Hansard* cutting service. A slight disadvantage of ours is that it is run by a charity with slightly different interests to us so they don't necessarily cut out things that we want.

Interpreting statistics

Having got round the problem of getting hold of data, how do we understand and interpret them? The first question to ask is how are statistics collected as how you collect data will determine partly what answers you get. For example, in the *General household survey* people are asked whether they suffer from long-standing conditions which affect their activity. The form of the question was different in 1977 and 1978 when people were given a check-list

FIGURE 2. *Numbers of people on waiting lists for in-patient treatment, England, 1970–84.*



Source: DHSS *Hospital return* (SH3) and *Waiting list return* (SBH 203).

of conditions. When this was used a lot more people appeared to be suffering from chronic disease.

Another point to look at is the way that data are collected. Figure 2 shows the numbers of people on waiting lists for in-patient treatment in England over a number of time periods. The data are collected via two separate statistical returns to DHSS. Now there have been claims in the press that waiting lists are decreasing and if you compare 1979 with the most recent point, you do find the numbers have gone down. But of course the peak was at the height of the ancillary workers' industrial action in 1979 when as a result the numbers on the lists had gone up. On the other hand you could perhaps compare two different points and say waiting lists with these data are increasing. You can really reach whatever conclusion you choose.

Another thing that happened during the period covered by this graph was that in 1979, health authorities weren't sure whether to include people waiting for day-case treatment on waiting list returns, so DHSS positively instructed authorities to omit them. Now some opposition politicians said this was a deliberate fiddle. In fact the tidying-up of the procedure was a valid thing to do but it did conveniently help reduce the numbers which were not exactly decreasing.

The lesson about this is, if you can get hold of it from DHSS, is to read what the statisticians say about the statistics. Some people think that waiting lists are a good measure of unmet need but DHSS statisticians say on their annual summary, 'waiting lists have shown a proportion of those on waiting lists have died, moved to another area, do not want the intended operation or appear on more than one list. The amount of overstatement cannot be readily estimated but it is thought to exceed 10 per cent nationally and could be considerably more. The figures cannot therefore be relied upon as absolute indicators of demand for elective admissions to hospitals'[24].

So though some reports in the press say that the only cuts in the NHS are in waiting lists, there is no evidence that they are decreasing. Bernard Shaw had a lot to say about statistics and statisticians when he criticised doctors. In his prelude to *The doctors dilemma* he said 'Now the man in the street knows that you can prove anything by figures but he forgets this the moment figures are used to prove anything he wants to believe'[25].

The next question to ask when looking as statistics is how are they classified? For example, what areas are used?

In 1974 both the health service and local government were reorganised. The health service was divided into regions subdivided into areas with districts within them. Local government was divided into counties and metropolitan counties with county districts within them. In some places the NHS and local government used the same areas but in many places they didn't. Often NHS areas had the same boundaries as counties but in the next reorganisation of the NHS in 1982, areas were abolished. Then in 1986 the Greater London Council and the metropolitan counties will be abolished. So if you wanted to compare social services statistics which are based on local government they won't relate necessarily to the same areas as health service statistics.

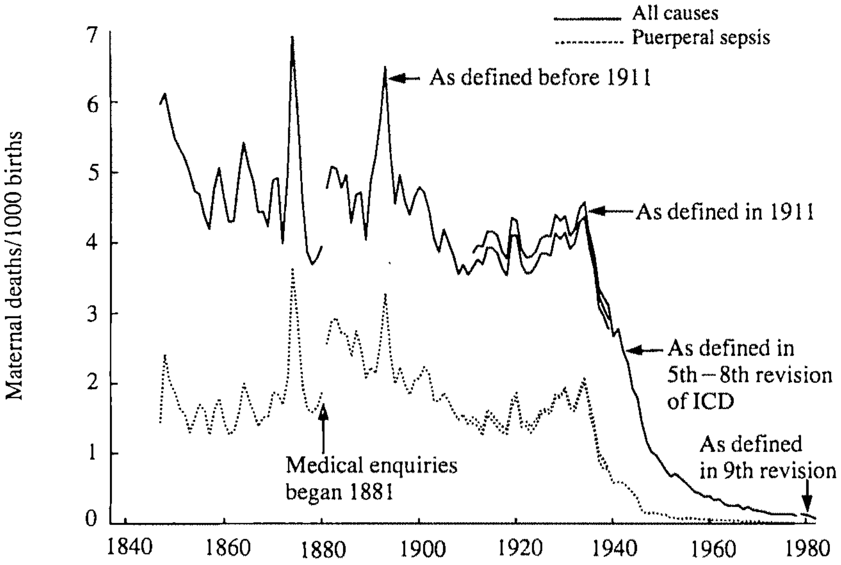
What is more – there are fourteen health service regions and in particular the south-east of England is subdivided into the four Thames regions. This is so that no one region has all the London teaching hospitals in it as they are rather expensive to run relative to other hospitals.

On the other hand, much economic data are based on standard regions and these of course are different. Some NHS regions are similar to standard regions but the rest have different boundaries making them difficult to compare.

The next aspect which that can change is the way you classify diseases. The International Classification of Diseases (ICD) is revised about every ten years or so. Categories which exist in one revision may be changed at the next. Sometimes the broad categories stay the same and sometimes not. Fortunately OPCS publish analyses where in the year in which the classification changes they classify deaths by both classifications and calculate adjustment factors. Even so there are problems when you are looking at data collected over time.

Figure 3 shows deaths in childbirth over a very long period going as far back as we can get in England and Wales to 1847. The solid line shows deaths from all causes attributed to childbearing and the dotted line shows deaths which were attributed to puerperal fever. In the 19th century the General Register Office was aware there was under-reporting of maternal deaths so in 1881 it started to send out letters of enquiry to doctors who had signed death certificates for any woman of childbearing age, to ask specifically if the woman died in childbearing. The year it started to do this there was a great apparent increase in maternal mortality showing it had previously been under-reported.

FIGURE 3. *Maternal mortality, England and Wales*, 1847 – 1982.



Source: OPCS *Mortality statistics*.

Over the years the classification kept on changing. For a number of years the deaths were classified in two ways which is why in some places in Figure 3 there is a double line, although they have roughly the same shape but different values. The definition of maternal deaths stayed the same in the fifth to the eighth revision of the ICD, but then it was changed again in the ninth revision which has been used since 1979.

The reasons for changing the definition reflects people's views of whether death was thought due to pregnancy or whether it was thought to be otherwise. For example, 'criminal abortion' used to be classified amongst accidents and violence up to 1926. After that illegal abortions were included among 'deaths of women known to be pregnant'. There was certainly under-reporting before abortion was legal when women had had a backstreet abortion and it had gone wrong so they had to go into hospital. Then there was a tendency to say that they had miscarried.

When statistics on hospital in-patient stays expressed as rates per 10,000 of population in each age group are plotted separately for men and women, it can be seen that women have many more stays in hospital. This does not necessarily mean that women are ill more often as many of these stays in hospital by young women were related to pregnancy. If you take out the things that are specific to each gender you will find that women make marginally less use of the health service. In other words it may be men who are more ill or make more use of the health service which may not be the same thing of course. It may be that they are able to get more access to hospital care. As a result we are not simply comparing ill health here. Another factor often used for comparison is social class or in the case of babies their father's social class. A problem in comparing trends in say perinatal mortality by social class is that the classification is revised for each census so that some categories change.

For babies the comparison by social class is confined to those whose parents are married. As we know an increasing proportion of them are unmarried these days. When we look at births outside marriage, we find that the group that is increasing in number is that jointly registered by both parents. Personally I feel that this group should be combined with the married category when looking at the mortality of their babies whereas obstetricians consider the lack of a marriage certificate to be an obstetric risk factor. This applied to 17·4 per cent of babies born in 1984[26]. Within that group there would certainly be some women who are at very high risk. Our survey of home births revealed some horrendous stories of concealed teenage pregnancies[27]. On the other hand, many unmarried couples are better off than some married people.

Babies usually group into social classes using their father's occupation. This raises the question of which parent's occupation is appropriate to use. Women don't arrange their marriages so that they fall into the same social class as their husbands. Yet this raises some anomalies about the question of what social class means and how it relates to disease. I'll quote Bernard Shaw again,

> 'Comparisons which are really comparisons between two social classes with different standards of nutrition and education are palmed off as comparisons between the results of a certain medical

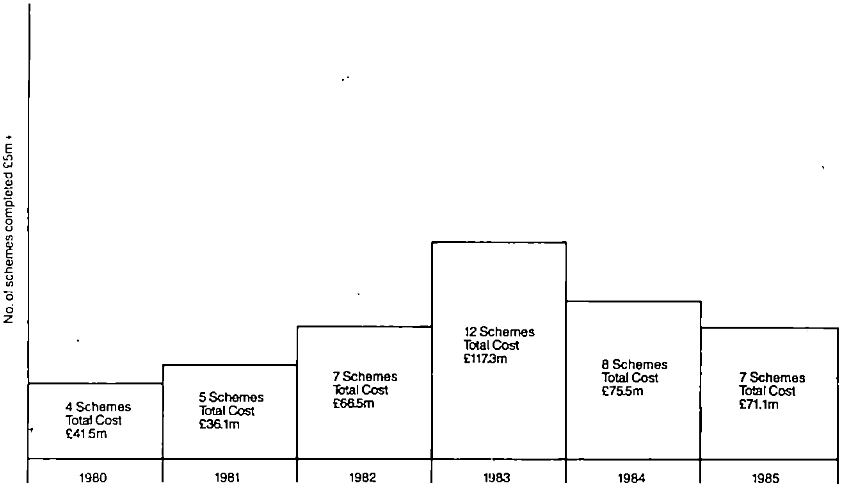
> treatment and its neglect. Thus it is easy to prove that the wearing of tall hats and the carrying of umbrellas enlarges the chest, prolongs life and confers comparative immunity from disease; for the statistics show that the classes which use these articles are bigger, healthier and live longer than the class which never dreams of possessing such things'[28].

The next question to ask when looking at statistics is what is included and what is left out?

There is an interesting example in the *Annual report* of the Health Service in England for 1985[29]. I don't know if the blue cover is anything to do with the fact that the launch took place at the Conservative Medical Society's conference on 23 November 1985, but that's not for me to comment on. It tells us as figure 4 shows, the 'Annual number of schemes in excess of £5 million completed 1980–84', now you will notice a certain lack of labelling in that the vertical axis has no numbers there at all. In 1980 four schemes cost £41 million but in 1981 five schemes cost £36·1 million so if the columns represented cost, the second would be lower.

Of course rather than the number of new schemes it might be more relevant to know about capital expenditure on the health service. The *Annual report* tells us that in these new hospital schemes 11,000 new beds were provided over the period 1980–84 but there is no mention of how many have closed. A different picture comes from the *DHSS Statistical Bulletins* which are fairly difficult to get hold of and are duplicated typescripts with badly-printed tables. Having said that, if you can get them you can look at long-term trends and see that the number of beds available daily has actually decreased.

FIGURE 4. *Annual number of schemes in excess of £5m completed 1980–84 plus estimated for 1985 in England.*

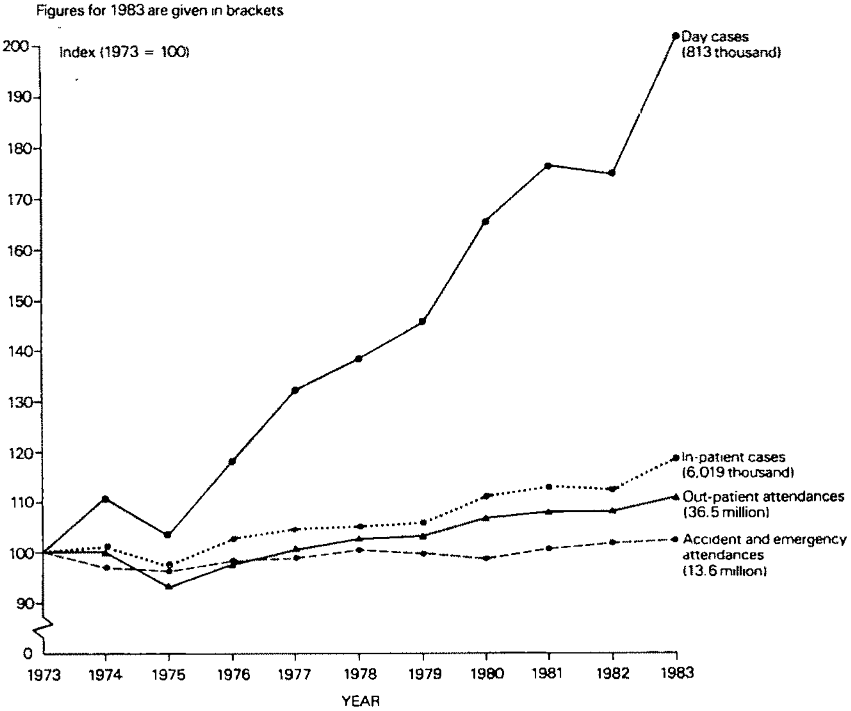


Reproduced from *The health service in England. Annual report 1985*[37].

Another thing that can happen when you look at things over a period is changes in definition compared with the major changes in classification mentioned earlier. These are minor changes but they still have an impact. Because so many work part-time, staff figures for nurses and midwifery are usually presented as 'whole time equivalents' so that someone who works part-time would be counted as a fraction of the working week that he or she works. In 1980 the working week was shortened so everybody who worked part-time became a larger 'whole-time equivalent' overnight. Then more people had to be taken on to make up the hours not worked by the full-time staff who had a shorter week. So when account is taken of this the apparently large increase in numbers of nurses over the past few years becomes very much smaller.

An important point to look at when statistics are presented graphically is the type of scale used. DHSS *Prevention and health; everybody's business*[30] presented death rates attributed to diptheria in children under fifteen over a long period on a logarithmic scale. To any of you with a mathematical and scientific background, this will tell you the rate of change. The rate of fall in mortality seems to have increased after antitoxin was introduced and even more since immunisation has been available. Anyone who doesn't understand this scale may interpret it as saying immunisation was the major factor in reducing mortality from diptheria.

FIGURE 5. *NHS hospital activities 1973–83 in England.*



Reproduced from *The health service in England. Annual report 1984*[38].

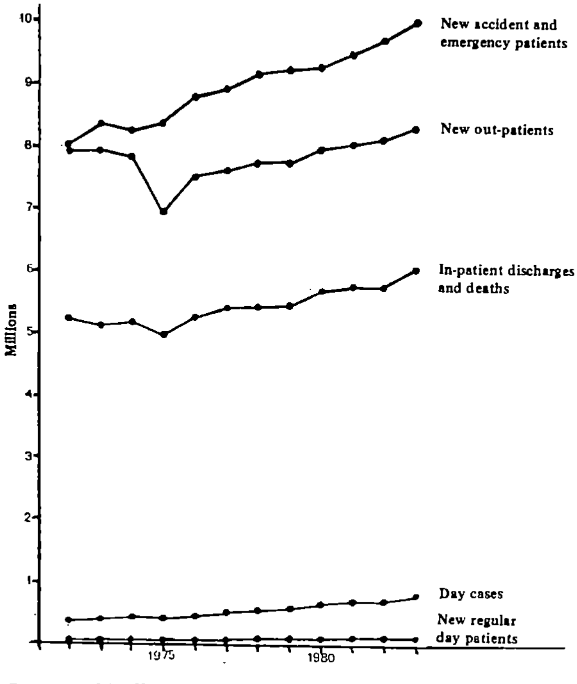
What logarithmic scales don't tell you is the size of the problem. When you look at the death rates plotted on an ordinary scale it can be seen that though immunisation did speed up the decline of diptheria it was introduced at a relatively late stage when mortality had been going down for some time[31].

Another method of presentation which can be misleading is to express data as percentages of what they were at an earlier period. The 1980 *Annual report* of the health service presents day cases – in-patient cases out-patient attendances and accident and emergency cases as a percentage of what they were in 1978 which seems to be the usual year used for comparison these days and shows an increase in all the variables. Figure 5 which comes from the 1984 *Annual report*[32] shows the same four variables presented as a percentage of their values in 1973 and you can see the increases are really part of a longer-term trend that went back before 1978.

It is also important to look at the variables themselves. In-patient cases as Dr Alderson mentioned[33] are not the same as people treated, thus 6,000 in-patient cases could mean 6,000 people treated once or one person admitted 6,000 times during the year! Out-patient attendances do not relate to the number of people but the number of times they attended and the same is true with accident and emergency attendances.

Figure 6 is an attempt to relate data far more closely to numbers of people and shows new accident and emergency patients, new out-patients and in-patient

FIGURE 6. *NHS hospital activity statistics, England, 1972–83.*



Source: *DHSS Statistical Bulletins*, (1), 1984, and (2), 1984.

discharges and deaths. The day cases which dominated Figure 5 are right down at the bottom of Figure 6 because the numbers are so small. As a result the proportional increase is greater. There are similar patterns among operation statistics. Because new treatments such as coronary bypass operations are relatively few in number but increasing at a great rate, there are apparently huge increases if they presented on a percentage basis. This is despite the fact that numerically they may be less frequent than more common operations, such as those for hernias and varicose veins, which are well established and are not particularly increasing in number. So it should be asked whether the appropriate variables to select when looking at the activity of the health service are those relating to new operations being done or those relating to operations for conditions such as hernias and varicose veins.

Further what is the relevant variable to choose for measuring health service activity? Is it the numbers of discharges and deaths – the number of times people have passed through hospital or the decreasing average number of beds occupied daily.

In any case how do you relate discharges and deaths to people. We don't really know about the extent of double-counting and if you look at reports of hospital in-patient enquiries it says quite clearly that people are counted each time they are discharged from hospital. We do know that in maternity units the number of discharges per woman delivering is rising and the *Annual report* says there are more anti-natal admissions in relation to numbers of deliveries[34]. In mental-handicap and mental-illness hospitals the increase in hospital stays over the last few years has certainly been largely in readmissions. This is because of a deliberate policy of admitting people for short stays, discharging them and allowing them easier readmisssion if necessary. While this is something which is thought to be clinically appropriate for the people concerned, it's certainly not statistically appropriate to count each readmission separately. Some people have presented the rise in numbers of in-patient cases as meaning that people have been discharged too early after operations and therefore have to be readmitted. While there is anecdotal evidence of this it is certainly not the whole story.

I'll finish with an example which takes into account a number of the different things I've shown. Nicholas Wells (see pp. 133–143) mentioned the many excellent publications produced by the Office of Health Economics, and in my field it has done an excellent briefing on perinatal mortality which we use as teaching material. On the other hand this example comes from some of its less excellent work in which it claims that drug companies have saved the NHS vast sums of money[35].

Table 1 attempts to estimate financial savings resulting from the reduction in the numbers of hospital 'bed days' between 1957 and 1982. 'Bed days' means the total number of days each hospital bed in the country is occupied. The analysis compares six categories of infectious disease, respiratory tuberculosis and also other infectious diseases and mental illness. The first discrepancy is that in 1957 the data applied to England and Wales but in 1982 to England only. So you would expect a reduction in hospital 'bed days' as a result of this. Next, there were three revisions of the International Classification of

Diseases between 1957 and 1982 so the categories may not have been the same in the two years.

Another point to consider is the prevalence of the disease in question. For example notifications of respiratory tuberculosis declined a great deal over the period so even if the treatment was no more effective it would be expected that there would be much fewer people with respiratory tuberculosis occupying hospital beds. This still does not take into account any change in the age structure of the population because if the disease is more common in certain age groups than others this would affect the overall rate.

I don't know of any valid or reliable statistics about the incidence of mental illness, as it is a very difficult thing to define. In the past there were people who were 'put away' for having an illegitimate child and became institutionalised, although they might not have had what we would consider today to be a 'mental illness'.

The article ignores these points and goes on to convert the difference in 'bed days' to savings in hospital costs. Even if this was valid it would not represent the total cost to the health service. If people are spending less time in hospital because there are drugs to control their disease, or for other reasons, they may need help from the community health services, or from social services, or, perhaps more often, their families and friends. So, confining the calculation to hospitals leaves out a lot of possible costs which could be considered.

TABLE 1. *Financial savings from the reduction in hospital bed days* 1957–82.

Disease	*Bed days 1957* (millions)	*Bed days 1982*† (millions)	*Saving in bed days 1957–1982* (millions)	*Saving in hospital costs (£)* (millions)
Asthma	4·63	2·29	2·34	176
Epilepsy				
Glaucoma				
Hypertensive disease				
Bronchitis				
Skin diseases				
Respiratory tuberculosis	6·89	·11	6·78	509
Other infectious diseases	2·77	·55	2·23	167
Mental illness	52·49‡	25·16	27·32	847
TOTAL				1699

* England and Wales
† England only
‡ 1959

Source: Teeling Smith, *and* Wells[39].

To sum up, when you are looking at statistics and trying to understand them, you want to look firstly at the process of collection of data, including which items were collected, how they were collected, what questions were asked and what was meant. I think it is very important to go back to the source documents and actually see what the statisticians said about the statistics, rather than read a review paper. It is also important to go back to the original – to see how data are classified and analysed and, again, it's important to look at the original description.

Secondly, it is important to consider how the data are presented. For example, which items are selected to be presented and which are left out, and how they are presented – including what sort of scales are used and what that means.

Finally, questions need to be asked about the interpretation of data. If there really are more patients being treated, does this reflect the fact that there are more people in the age group who make the greatest use of services? Even more important, is the treatment they are receiving effective, is it acceptable to the recipients – we don't have many statistics about what people think about the treatment they receive – and are there any side effects? So the statistics of activity leave that out and what is left out is either not collected, or collected but not presented.

I think these are things to bear in mind, both in looking at the statistics that there are, and also understanding about gaps in statistics, particularly in morbidity statistics. Obviously, I would like to see us go forward and try and use the technology we have to collect more relevant statistics, but I am slightly depressed that most of the investment at the moment is being put into management and activity statistics.

Postscript

Health and personal social services statistics for England 1985 was published five days after the seminar. It would appear that the only publicity it received was an announcement in a written reply in *Hansard*[39]. In February 1986, the DHSS revealed in response to a parliamentary question that it had now reverted to publishing *Health and Personnel social services statistics for England* on an annual basis and that the 1986 edition was planned to appear during the summer of 1986[40].

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How the OPCS Library can help

Suzanne Burge
Librarian, Office of Population Censuses and Surveys (OPCS), London

Transcript of a talk given at the Aslib Biological & Agricultural Group seminar, 'Medical Statistics', Guy's Hospital Medical School, London, 29 November 1985.

This paper is in two parts, the first describes the range of OPCS publications and the second the services which the Library can (and cannot) provide.

OPCS publications

The Office of Population Censuses and Surveys and its Library naturally cover a far greater area than just that of medical statistics, and there are two subject fields within that broader area which I plan to return to briefly later, as I believe they are of interest to those working with medical statistics. The most important OPCS series from a medical statistics point of view are the annual reference volumes. There are now twenty-one annual volumes, plus a number of less-frequently published volumes and one-offs. A complete list of them is given in the OPCS Sectional List No. 56, obtainable from Her Majesty's Stationery Office (HMSO).

The largest group are the *DH* volumes – deaths. The first of these, *DH1*, simply presents general mortality statistics, but the *DH1* series also includes a number of one-off volumes on special topics such as trends in respiratory mortality, trends in cancer mortality, and serial tables giving data from 1841 to 1980. It is intended to publish the serial tables volume every five years, bringing together a number of serial tables previously scattered through the *DH* volumes.

DH2, deaths by cause, analyses deaths by the ICD, the International Classification of Diseases. (The UK WHO Centre for the Classification of Diseases is based at OPCS.) The deaths are also analysed by age and sex.

DH3, which deals with perinatal, infant and childhood mortality, is now divided into two volumes. *Childhood* gives figures for still births and infant deaths, and *Infant and perinatal: social and biological factors* gives a range of medical and demographic data. It includes social class, area of residence, mother's country of birth, cause of death, place of confinement, and also birth-rate data and information on multiple births. For information on births of all types, multiple and otherwise, which do not have a tragic outcome, a useful source is the OPCS volume *FM1* – *Births*. One should also mention in this

Aslib Proceedings, **38** (5), May 1986, p.163—168. Printed in Great Britain.

context the two-volume work by Alison Macfarlane and Miranda Mugford *Birth counts* (HMSO, 1984), which brings together a whole range of statistics on pregnancy and childbirth.

To continue with the *DH* series, *DH4* is deaths by accident and violence. It contains statistics on suicide, and is also the place to look if you want to know how many people have been struck by lightning, or the range of substances by which people have been poisoned. The final volume in the series is *DH5*, deaths by area, which contains breakdowns by cause, sex and age group down to country and district level and for regional and district health authorities. Only the introduction, the total death rates and the standardised mortality ratios appear in hard copy. The rest of the data is on microfiche, a medium increasingly used for the release of official statistics because they are too expensive in hard copy.

The other OPCS reference volume chiefly published in fiche form is the one to which almost all the other seminar papers have referred, the *Hospital in-patient enquiry (HIPE) main tables.* Summary tables for HIPE, which make up the other half of OPCS's *MB4* series, are still available in hard copy, and both *MB4* publications, the summary and the main tables, appear annually. The *MB4* series also contains a number of one-off volumes, for example *Maternity patients 1973–76,* and *Patterns of morbidity 1962–67.*

The remainder of the *MB*, the morbidity series, cover cancer statistics, communicable diseases, and congenital malformations. *MB1*, the cancer statistics series, has an annual volume on cancer registrations, less frequent volumes on survival, and a one-off, the *Report of the Advisory Committee on Cancer Registration*. *MB2*, communicable diseases, is what used to be called statistics of infectious diseases. It covers the range of dire ailments from anthrax to yellow fever – no cases of either in 1983 – but also includes things like measles, mumps, chicken pox, whooping cough and food poisoning. It also has statistics, derived from forty general practices, on non-notifiable respiratory ailments, so you can find information on the common cold, influenza, asthma, etc. The final tables in the volume give meteorological data, statistics on rainfall, temperature and sunshine for each quarter of the year concerned for all regions, and the same statistics, rainfall, temperature and sunshine for each year from 1921 to date. The relationship between weather and communicable disease is, after all, long established. Only one volume has been published so far in the *MB3* series, *Congenital malformations* and this covers 1971–80.

OPCS also publishes an annual reference volume on abortions *(AB)*, which has a range of demographic and medical data on legal abortions. Lastly there are two other items in the reference volume series which contain items of medical interest, the *Longitudinal study (LS)* and the *Decennial supplement (DS)*. *LS1*, the first report from the *Longitudinal study*, gives socio-demographic mortality differentials, and the *DS* series contains a number of reports on occupational and area mortality. The other volumes in the reference series are demographic – population estimates and projections, marriage and divorce statistics, electoral statistics, migration etc.

Between volumes, the data in the reference series is updated by OPCS monitors, which have the same numbering system as the volumes, *DH*, *MB* etc. The monitors are available free from OPCS's Information Branch (St Catherine's House, 10 Kingsway, London WC2B 6JP) and you can go on the mailing list for any or all of the series.

Before 1974, the year when the reference volumes began to appear, the statistics were published in the *Registrar general's statistical review for England and Wales.* This began publication in 1837, but the only statistics of medical interest in the 1837 volume are those on causes of disease. As the title of the *Statistical review* indicates the statistics are for England and Wales, and this is true of a great many OPCS publications. If you want figures for Scotland and Northern Ireland you will have to turn to the annual reports of the registrar's general for Scotland and for Northern Ireland, both of which are published by HMSO.

There are also a number of other OPCS publications which may be of interest to those working with medical statistics. The most important of these is our series – Studies on medical and population subjects (SMPS). Titles published in 1985 included *Infectious diseases during pregnancy* and *Occupational reproductive epidemiology.* This is the series in which the morbidity studies from general practice appear. Other earlier titles have included a number on cancer, cancer mortality by occupation and social class 1851 to 1971, oral cancer, childhood cancer, and other studies on child health.

The SMPS are published by HMSO but our other series, Occasional papers are published in-house and are available from our Information Branch. Most of the occasional papers deal with population or social survey topics, but there are a few medical titles, the most recent being, *Criteria for determining areas with high and low mortality.*

Finally, there are the OPCS social survey reports. A number of those are commissioned by the Department of Health and Social Security (DHSS) and deal with medical topics. Of the continuous surveys, several other speakers have already referred to the *General household survey (GHS).* It has a chapter on health and carries other material of interest. If you are not already familiar with *GHS* it is worth having a look at, as it is an invaluable source for a whole range of social statistics. It is collected by personal interview from a large national sample of the population, and contains information not to be found anywhere else in official (or other) statistics. The chapter on health has sections on chronic and acute health problems, on visits to general practitioners (GPs) and to hospital out-patient departments and stays in hospital. The 1982 *GHS* includes material on private medical insurance, describing the characteristics of people who hold and people who are covered by private medical insurance policies, and the relationship between insurance cover and reported ill health. It also has a short section on the use of contact lenses, and chapters on smoking and drinking, chapters published every other year. 1982 has a chapter too on smoking, drinking and health, which examines relationships between the three and people's perceptions of the damage caused to their health by smoking and drinking. Earlier volumes have included sections on tinnitus, accidents in the home, the use of health and personal social services, and hearing aids. The *GHS* is the only source of data on medical conditions which people do not, for whatever reason, take to their GP or hospital.

Smoking and drinking which I referred to in the context of the *GHS* have also been the subjects of a number of ad hoc social survey reports. We have recently published a study on smoking attitudes and behaviour, and research is currently in progress on children's smoking. A survey on women and drinking came out in December 1985. One point that arose in this survey concerned occupation. Because the high risk occupations for men tend to be very male-dominated it was necessary to draw up a new classification to apply to women. This found that those women working in service areas, which included hairdressers and librarians were particularly risk prone. Other surveys which have appeared recently have been on dental health, registration with GPs in inner London, and nurses in the community. Work is currently in progress on drug abuse, maternity services, and disability, which is a very under-documented area.

This has been a very rapid survey of those OPCS publications of interest for medical statistics. There is, of course, a vast number of other publications in the field, and OPCS Library tries to hold at least the major series. We collect World Health Organisation and other international statistics, and also census and vital and health statistics from any country we can set up an exchange agreement with. All our foreign material is collected on exchange, which has a number of advantages and disadvantages. Though the collection has gaps it is very wide-ranging, covering areas possibly not reached by other government departments. It goes below national level to pick up regional and city health and population statistics. Unfortunately it is not properly catalogued, and though we hope in the future to produce hand lists there is nothing available at present. The material is however largely self-arranging and it is relatively simple to check the shelves for particular publications or information. In the last few years there have been a number of projects to compile listings of census information for particular parts of the world, but there seems to be nothing similar for medical statistics.

As I mentioned at the beginning the Library's subject area goes much wider than medical statistics. OPCS is naturally very interested in demography. We hold a complete set of UK census publications from 1801 onwards. For 1971 and 1981 this includes the small area statistics, which make available on microfiche data for each enumeration district. Enumeration districts are the smallest areas for which data is made available, an average of about 250 households, the area covered by one census enumerator. The 1971 and 1981 small area statistics are in microform and can be consulted in the OPCS Library or bought from our Customer Services Division in Titchfield in hardcopy, fiche or magnetic tape form. The census is a very basic building block for much research in the medical field as in many other areas.

The other section of the OPCS Library's collection, which I believe may be of special interest, is that on survey methodology. We have what I like to think is one of the best collections in the country on everything connected with carrying out a survey, sampling, questionnaire, design, interviewing, data analysis and presentation.

OPCS Library services

When I talk about the Library's services I have to stress that our first responsibility is to the Office, and its needs always have to take precedence, but within that we do try to provide as much assistance to the public as possible. We are one of the few government libraries which announces itself as open to the public, though we tend to say this rather quietly as we have space problems. We normally let people in without an appointment unless they want to use the small area statistics. We only have a limited number of microform readers so you do need to book for these. Our opening hours are 9 a.m. – 4 p.m., Monday – Friday. We average about fifteen visitors a day, these include academics (we have a considerable number of academic institutions in the immediate vicinity), doctors, medical researchers, pressure groups, students, and even the occasional schoolchild. We try to give as much help as we can, but this is chiefly in the form of pointing them towards publications. We are not qualified to interpret statistics. If users have real problems with statistical tables we will usually contact the appropriate statistics division, who are generally very helpful.

We also take telephone enquiries, but we prefer not to give statistics over the phone for obvious reasons. It is too easy for them to be misheard, and crucial footnotes etc can be missed. If we do give statistics we issue a standard disclaimer of responsibility for these reasons – we always prefer to refer someone to a publication.

I would also like to point out that we are by no means the only government department dealing with statistics. The simplest way of defining the division between the Department of Health and Social Security and ourselves is that OPCS deals with mortality and morbidity and DHSS with administration. One of the best ways of getting an idea of who deals with what is the *Guide to government department and other libraries* now published by the British Library. There is a new edition out shortly.

As to our loan facilities, we do provide an interlibrary loan service through the British Library, though obviously if the item in question is one of our publications and still in print we would prefer you to buy it. Some of our older material is now very fragile and we have therefore stopped photocopying anything published before 1931. We do not have a photocopier in the Library, and so there is usually a twenty-four hour delay before copies are ready.

Finally, the Library's publications. We issue a monthly accessions bulletin which lists everything added to stock including our foreign statistics and new journal titles. We publish a series of information sheets, some of which are intended for our readers within OPCS, but others of which, our journals list for example, have a wider distribution. We issue a number of listings of OPCS publications, one for studies on medical and population subjects, one for the occasional papers, and several for social survey reports, one each for the first and second twenty years of the survey's existence, and a cumulating one which covers 1982 onwards. The social survey lists have author, subject and commissioning organisations indexes. There is also a list of OPCS non-HMSO publications which we produce annually. Non-HMSO publications are a vexed issue for all of us – we have almost as much trouble getting our own departments to tell us about them as outsiders do. Too often we find out about something our own department has issued through someone outside the department!

Last, but by no means least among the Library's own publications are our bibliographies and reading lists series. There are a considerable number of medical titles among these, mortality, morbidity, perinatal and infant mortality, alcohol and alcoholism. These like our accessions bulletin can be mailed to you on request.

Handling statistical enquiries in the medical library – some practical examples

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Paper presented at the Aslib Biological & Agricultural Group seminar, 'Medical Statistics', Guy's Hospital Medical School, London, 29 November 1985.

Introduction

Every library school student knows that statistics – like conference proceedings and technical reports – belong to that category of material called 'difficult literature'. It is true that often it is not easy to find out what is available, and that frequently the published statistics do not give the figures in quite the way that your enquirer wants. A starting point for many enquiries will be the *Guide to official statistics*[1], compiled by the Central Statistical Office and the coverage of which is much wider than might be expected from the title. However there are other sources of information which may be less obvious, and these include recent journal articles and reviews, annual reports of organisations, textbooks, monographs and computerised bibliographic databases. In addition there are a number of organisations which may be able to provide statistical information or advise on it, such as the Office of Population Censuses and Surveys (OPCS), the Department of Health and Social Security (DHSS), the Office of Health Economics (OHE), and the Royal College of General Practitioners. Bear in mind too that the various tiers of the National Health Service may issue their own statistics, for example the North West Thames Regional Health Authority produce their *Annual patient statistics* which give figures by district and by individual hospital. Libraries should try and get themselves on the mailing list for these documents!

What I would like to do now is to take some practical examples of 'real' statistical enquiries, and see how they can be answered. One point to make here is that there may not be a single correct answer – the information may be available from a number of different sources, and such sources may not always give exactly the same figures, as we shall see.

Statistical information on cancer incidence

It has been argued that too much information on cancer is being published, most of it highly detailed. Generally speaking it is not difficult to find mortality

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CENTRAL LIBRARY

statistics for different types of cancer in Great Britain by using the various OPCS publications[2]. However I have found that quite a few enquiries received in my own library are more general in natural, and request an overview of the incidence of cancer. The following titles are ones that I have found useful in this regard:

CALMAN, K.C. *Introduction to cancer medicine.* Macmillan, 1978. (Chapter 3 – 'Prevalence of cancer'.)
SCOTT, R.B. *Cancer–the facts.* Oxford University Press, 1979. (Chapter 4 – 'Some figures'.)
HANCOCK, B.W., *and* BRADSHAW, J.D. *Lecture notes on clinical oncology.* Blackwell Scientific, 1981. (Chapter 1 – 'Cancer overview'.)
FRY, J. *Common diseases.* 4th ed. MTP Press, 1985. (Section 50 – 'Cancer'.)

For example, Hancock and Bradshaw give a table for the incidence in western countries of cancer by site for both males and females. The book by John Fry provides a helpful overview, covering the world situation, mortality in the United Kingdom and the position in a local general practice, together with five-year survival rates for different types of cancer. Perhaps I could also mention three journal articles which contain useful information on trends in cancer incidence and on geographical variations that might be difficult to locate in more conventional statistical publications:

COGGON, D. Trends in cancer mortality in England and Wales. *Heath Trends,* **13** (4), November 1981, 89–93.
ALDERSON, M.R. Geographical distribution of cancer. *Journal of the Royal College of Physicians,* **16** (4), October 1982, 245–251.
SILMAN, A.J. Regional differences in cancer survival. *Hospital Update,* **11** (10), October 1985, 735–746.

Health Trends is a useful publication produced by the DHSS which looks at diseases of current interest and developments in health care. It is not indexed by *Index Medicus* and so its articles are often not picked up by a literature search. The review by Alderson is international in scope, and while the article by Silman confines itself to England and Wales, it includes the excellent tables and diagrams that are characteristic of the *Update* journals. One general point to note when dealing with statistical sources is that it is essential to check whether figures cover just England, or England and Wales, or Great Britain, or the United Kingdom (all of which will of course give different answers!).

The epidemiology and occurrence of disease

While it is relatively easy to obtain statistics in Great Britain for causes of death – mortality, it is less simple to find figures for the incidence of different types of disease – morbidity. Nevertheless librarians are often asked to locate such information. I would like to mention three titles that I have found to be of assistance here:

PEACH, H., *and* HELLER, R.F. *Epidemiology of common diseases.* Heinemann Medical, 1984.
FRY, J. *Common diseases: their nature, incidence and care.* 4th ed. MTP Press, 1985.
OPCS *et al.*[3] *Morbidity statistics from general practice 1971 – 72.* (Second National Study.) HMSO, 1979.

The book by Peach and Heller is intended for medical undergraduates and includes figures derived from the *Hospital in-patient enquiry* and *Communicable disease statistics* (both OPCS). In some cases it contrasts the picture in England and Wales with that in the rest of the UK and other countries. Fry's book, already referred to, is based on figures collected since the start of the National Health Service in the author's own general practice in Beckenham, Kent. While it has been suggested that this is perhaps not a typical practice area, it is difficult to know what would be typical for the whole country. If we take as an example an enquiry about the incidence of asthma, we can see that different sources can give different figures. Peach and Heller state that in 1970 – 71 an average of ten people per 1,000 of the population consulted their GP (general practitioner) because of asthma, while Fry's figure for his practice is 15 per 1,000, though of those only half will seek treatment in any one year. In the introduction to this paper I suggested that a textbook or monograph can sometimes provide statistical information. T. Clark's book, *Practical management of asthma* (Martin Dunitz, 1985), says that there will be 125 asthmatics in the average practice – a much higher figure than the other two sources. It should perhaps be added here that asthma is a notoriously difficult condition to define.

In order to use the third title above, *Morbidity statistics from general practice*, to best advantage, it is necessary to know the International Classification of Disease (ICD) number for the particular condition that is of interest. This is obtained from the ICD manual[4], which is published by the World Health Organization in two volumes. I would also mention here another possible approach, and that is to look for a recent review article or paper on asthma. This could be found via *Index Medicus*, using the appropriate sub-heading 'Occurrence' which is often helpful with epidemiological enquiries. Such a review will frequently give basic statistical data, with sources. If somebody else has already done the research, why repeat it, provided due acknowledgement is made?

The cost of hip replacement surgery: a database search

With increasing concern about the financing of the National Health Service in recent years it is not surprising that libraries receive enquiries of an economic nature (and these often have statistical connections). Hip replacement surgery is estimated to be the sixth most significant operation in terms of 'bed days', with 38,000 such operations being carried out annually in Great Britain (and an estimated quarter of a million operations each year in Europe and North America). But is it possible to say how much each such operation costs, at least for Great Britain? It would be feasible to relate figures for operations from the *Hospital in-patient enquiry* to the costs of hospital services as derived from such sources as *Health & personal social services statistics for England*[5] and the *Compendium of health statistics*[6]. However it may be that such a cost has already been worked out, and I decided to run a database search to see if this could help. The results from two different databases were:

Medline (1980–85)
HIP-PROSTHESIS WITH ECONOMICS : no references;
HIP-PROSTHESIS AND COST-BENEFIT-ANALYSIS : three references.

DHSS Data (1983–85)
HIP ADJ REPLACEMENT : ten references.

The *Medline* search on this occasion was not helpful. The use of the subheading 'Economics' produced no result, and the three citations from hip-prosthesis and cost-benefit analysis were not relevant to this question (however it should be noted that on a previous occasion a search on the costs of diabetes care had been successfully run on *Medline*). Although the DHSS database covers a shorter period, it came up with ten citations, of which three looked promising. The first was to a recent article in the *British Medical Journal,* the second to the book *Hip replacement – the facts* by K. Hardinge (OUP, 1983), and the third was to the most useful pamphlet *Hip replacement and the NHS,* published by the Office of Health Economics (1982) in their studies of current health problems series. This in fact proposes a figure of £1,200 for the cost of a hip replacement operation at 1981 prices. It is suggested, therefore, that a search of bibliographic databases may be of assistance with enquiries of a statistical nature. At some stage in the future databanks of statistical information may become available, but such developments still seem some way off in the medical and health fields. (However see reference 7.)

Social class statistics

It might at first seem strange to refer to social class in a meeting on medical statistics. However at Charing Cross we receive regular enquiries about the division of the general population into the various social classes, and I think this reflects the trend towards a more sociological interpretation of medical data. Much work has been done, for example, on the analysis of heart disease and dietary habits in relation to social class. The main source of information about the socio-economic groupings is the *Classification of occupations* (OPCS), a revised edition of which was published by HMSO in 1980 (see especially pages x-xi). This was examined by G. Boston in an article entitled 'Classification of occupations' in the summer 1980 issue of *Population Trends,* (20), 9–11, in which he discussed changes since the 1970 edition. Also helpful in this regard is the book *Community health, preventive medicine and social services* by J.B.M. Davies (5th ed, Bailliere Tindall, 1983). On pages 43–44 the author lists the six social class groupings, together with the percentage of the population in each class. To highlight one of the problems associated with the interpretation and use of statistics, Davies states that the percentage of social class 1 (professional occupations) is 5·5 per cent of the population while Boston, in the article referred to above, gives it as 6·3 per cent. Davies takes his figures from the 1971 census data, while Boston's are more up to date but are based on a smaller sample – the social class of fathers of children whose births were registered in the June quarter of 1979. Does this reflect a genuine trend in society, or just the way that the figures were collected?

Statistics on the sexually-transmitted diseases

My last practical example relates to the published statistics of the sexually-transmitted diseases (STD). One of our doctors asked for the latest-available figures on the number of new STD cases. He thought (quite correctly) that they would be in the latest issue of *On the state of the public health,* the annual report of the chief medical officer at the DHSS. Unfortunately, because of an acquisition problem, we had not then received the 1983 edition, and the 1982 copy gave figures only for 1981. I did of course promise to obtain the relevant information from another library as soon as possible, but I also wondered whether it might not be available from another source within our own collection. At the back of my mind I had an idea that the *British Journal of Venereal Diseases* (now renamed *Genitourinary Medicine*) reproduced these figures in some form, and a search of recent issues revealed that the June 1985 issue (**61** (3)) included the relevant part of the 1983 report of the chief medical officer (giving figure for 1982). Another recollection was that the *British Medical Journal* included an annual survey on the sexually-transmitted diseases (which is actually prepared by the Public Health Laboratory Service at Colindale, London). The issue for 14 July 1984 (**289**, 99–100) reviewed the position in 1982, but I could not locate a similar article covering 1983 or later. However my perusal of the *BMJ's* semi-annual index for the first half of 1985 led me to a news item headed 'Increase in sexually transmitted diseases' (15 June 1985, page 1,832). Although brief, this gave figures for 1983 – the most up to date in our search so far – stating a 6 per cent increase over 1982 in England. The news item referred to DHSS *Statistical Bulletin* ((3) 1985) entitled 'New cases of sexually transmitted diseases seen at NHS clinics in England 1973–83', and advised that this was available price £1 from the DHSS Information Division at Government Buildings, Honeypot Lane, Stanmore, Middlesex, UK. The *British Medical Journal* almost certainly picked up this information from a press release. These DHSS *Statistical Bulletins* are, as far as I am aware, a new method of disseminating statistical information (possibly because the *Health and Personal Social Services Statistics for England* has been rather irregular recently). While it could be argued that the price is cheap enough, the problem for libraries is that they would not normally receive the press notices which advertise their existence – and since they are departmental publications from the DHSS they would not appear in the HMSO lists. The moral here is that libraries in the health care field should keep an eye on the news sections of the *British Medical Journal, Lancet, Health and Social Service Journal* and indeed the daily press for references to recent publications of statistical interest. I would also commend to librarians the *Monitor* series produced by the Office of Population Censuses and Surveys which complement and update the annual reference series of statistical publications (and which are free!). See also reference 8.

Some other publications of interest

Finally I would like to mention four other publications which I have found to be of value from a statistical point of view. *Statistical News* is the quarterly journal of the Government Statistical Service, and contains both relevant articles and news of recent statistical publications and surveys undertaken. Issue number 67 for November 1984 included a description of the statistics operation at the DHSS. *Population Trends,* which has already been referred to, is the quarterly journal of OPCS. It contains explanatory articles, news items and statistical tables for population, births, marriage, migration, mortality and abortions, and in my experience these tables are often remarkably up to date. One table gives the past and present figures for the populations of the different health regions, thus indicating which are increasing and which are decreasing in size. *Social Trends,* which is annual, provides a valuable statistical analysis of British society today with the help of graphs, charts and explanatory text. Often the more controversial findings of a new edition (as happens with the *General household survey*) are featured in the newspapers in a brief burst of publicity. The *Registrar-general's weekly return for England and Wales,* which is issued in the OPCS *Monitor* series, provides the most up-to-date figures available for births, deaths and infectious diseases (the latter by type and administrative area). It is published about ten days after the end of the week to which it refers. People from the North-West of England may be interested to know that in the week ending 25 October 1985 there were three cases of malaria in the Manchester area. On that somewhat bizarre note I will conclude.

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7. DAVIES, P. Figures made to lie in state. *Health and Social Service Journal,* **96** (4987), 20 February 1986. 243. This states that health authorities' performance indicators are available on floppy disks at £45. Although short, this is a good review of the present state of DHSS publishing in the statistical field.
8. NURCOMBE, V. SCOOP News. *Refer,* 3(4), Autumn 1985, 17–19. This article mentions problems over the newspaper citation of official publications. The Standing Committee on Official Publications (SCOOP) has previously expressed concern about the publication of statistics via press notices.

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Information and the doctor

Richard Vincent

Consultant Cardiologist, Brighton Health District and Honorary Consultant Cardiologist, King's College Hospital, London

Paper presented at the Aslib Biological & Agricultural Sciences Group Annual Conference, 'Information in the life sciences: the next ten years', Natural History Museum, London, 6 November 1985.

Clincians spend much of their time manipulating information. Their diagnoses are made through a comparison between their knowledge of the body's behaviour in health and disease and fresh data from each patient they see. But the knowledge base in medicine is expanding at an overwhelming rate, while doctors' capacity to acquire, evaluate, store, and recall new knowledge is inevitably limited.

Present information technology allows rapid reference to the world's medical literature – through established library services or, more recently, through direct user access to major international bibliographies. But further developments, in intelligent user interfaces, in portable reference sources for selected data, and in systems for ready access to comprehensive reviews could improve the doctor's lot. Accumulated medical experience held on a user-accessible electronic index may also enhance the data on which the doctor is able to draw to optimise patient management. The value of any medical information, however, will still depend finally on the quality of scientific observation and on the competence of the medical reviewer. The medical librarian, too, will continue to play a key role, as a source of expertise in accessing specialist information, and as an adviser to users who wish to play a more active part themselves in electronic information technology.

About the author

Richard Vincent BSc MD FRCP AKC is Consultant Cardiologist in the Brighton Health District and Honorary Consultant Cardiologist at King's College Hospital, London. For the past ten years he has been actively involved in the application of computers to clinical medicine and has published widely on research topics in both clinical cardiology and biomedical engineering. He has been closely associated with the Graduate Division of Biomedical Engineering at Sussex University and is a member of its Steering Committee. He is also Chairman of the London Medical Specialist Group of the British Computer Society, a member of the Biological Engineering Society of Great Britain, is on the Editorial Advisory Board of the *Clinical Notes On-Line*, and on the Biomedical Engineering Committee of the Science Education and Technology Division of the Institute of Electrical Engineers.

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Introduction

A doctor's practice, like that of many other professionals, makes extensive use of specialist information. Some is static – like the unchanging fundamentals of anatomy, physiology and pathology – but much is changing as medical research constantly brings fresh insights into the presentation and processes of disease. Electronic and pharmaceutical advances also bring to the clinician an increasing array of tools for investigation and treatment. Time for acquaintance with new developments, let alone for a considered evaluation of their advantages and drawbacks is elusive.

From the outset, training in medicine presents its students with an enormous volume of information. In undergraduate days this is largely a catalogue of well-established truths to be learned by rote. The sheer volume of data, and the extensive specialised medical vocabulary which confronts the clinician-in-embryo leaves little mental energy or time for anything other than unchallenged absorption and (if possible!) later restatement at terrifying examinations.

The ward or clinic patient, too, brings doctors' attention to their own colloquial medical language – of present complaints and previous illnesses. Patient information, however, is neither structured nor academic but it both activates and constrains the 'medic' in the task of problem-solving for diagnosis and treatment. Indeed, acquiring information from the patient is central to the diagnostic process – information that comes from interview, examination, and potential numerous special investigations. It is from an amalgam of their knowledge of medical science and the accumulating data presented by the patient that doctors synthesise a diagnostic statement – albeit by a process that is only partly understood by the practitioners themselves.

Though they may not recognise it, doctors are a prime exponent of information processing.

A problem of overload

Retaining a wide knowledge base in medicine is a challenge for the cerebral hemispheres of most medical practitioners. Adding to the knowledge base of basic medical science, diagnostic methods, and treatments is a formidable task. Many have abandoned 'Keeping up with the literature'. They are paralysed by the sheer enormity of the task: more than 20,000 journals in biomedicine are published each year and a consultant in a single medical sub-speciality may need to read fifteen to twenty publications a month to keep up to date.

Fresh information in medicine may be sought by doctors through simple academic curiosity, or in response to a specific clinical need (a powerful motive). Information may also be thrust at them often in a highly-selected form by those who have at least *some* commercial interest in a particular subject area. But however doctors acquire it, new information – to be useful – must be evaluated, stored, and later recalled.

Present sources of information

Journals publishing peer-review papers, supplemented by tutorial and review articles from knowledged experts, remain the most trusted source of new medical knowledge. They are contemporary, readily available, and well indexed. But for many clinical practitioners the rewards of new knowledge per page are small. A single research paper rarely presents more than one 'take-home message' and a balanced assessment of even a small subject area may require the evaluation of many original articles.

More palatable sources of new information are found in year books, collected papers, or abstracts, and monographs – though the quality of these publications can vary widely and their content and scope is severely dependent on those responsible for their compilation. These forms of information exchange are growing in popularity especially where sponsorship from the pharmaceutical industry can meet necessary costs.

Information retrieval

Obtaining a satisfactory bibliography that includes the most recent publications in even a small subject area is a challenging task. Trailing references back through recent publications is an established if time-consuming technique, though it may lead to errors of omission. Printed indices of individual journals offer considerable help, but may also lead to the omission of work published in 'unexpected' places. Large printed references (such as *Index Medicus*) offer a more comprehensive overview of the literature, but may be time-consuming to use and less contemporary than is useful to some.

Following present trends in electronic information processing, the computer-assisted literature search now offers the best facility for a comprehensive, timely, and efficient search of published material. But its use depends on a clear understanding of the subject (especially its divisions and vocabulary) of the structure of the relevant database, and of the enquiry methods available in any one system. Library services offering this facility were established. But dialogue between 'medic' and the librarian undertaking an electronic literature search must continue to play a central role if it is to be fully successful.

The last three years have brought the novel introduction of databases to which the medical profession has direct access. Examples are the *Data-Star* system in Switzerland and *Knowledge Index* based on a large commercial computer in the US. Being able to link a home or departmental microcomputer to such extensive online indices is an undoubted attraction for the medical practitioner; and the costs charged *at present* make this a feasible proposition in practice for many doctors.

The motivation and interest in direct user enquiry is increasing, but searches made by users are subject to the same constraints and pitfalls as those initiated by librarians on their behalf. Indeed the pitfalls for users with little experience in information systems may be considerably more dangerous.

Finally, as the realisation grows that information is only of use if it can be sorted and recalled, personal databases to indexed published material or other accumulated information appear within the medical profession to be a growing phenomenon.

Future trends

Computer systems for data storage and recall are spreading remorselessly – not only through the professions formally concerned with information exchange, but also further into the world of the interested user. Hardware, software, and organisational developments should encourage this growth and should further enhance the facilities available. For example:

The user interface

The user interface on many computer systems seems cumbersome and restrictive; to the uninitiated it may be totally unintelligible. Software developments in the field of artificial intelligence and natural language, together with the growing sophistication of indexing systems, should allow future database enquiries to be held in a freer, more conversational style. Moreover, systems may one day be able to learn the characteristics of its users so that dialogues for data entry and enquiry can be tailored uniquely to individual needs.

Portable reference sources

With advances in the devices for data storage has come the possibility of *handheld reference systems* for at least limited subject areas. In the field of medicine, drug data systems are now available giving users access to important information on several hundred drugs including their indication, dose, side-effects and potential interactions. In principle, these devices mimic a doctor's major reference book which through micro-electronics has been shrunk to pocket size and given a fast but comprehensive index. Potentially portable databases could be made easily replaceable for enhancement and updating. If cost allows there is no reason why these systems should not become widespread.

Online medical reviews

For the ease of acquiring information, most 'medics' would welcome the availability of rapidly-indexed, highly-contemporary and succinct summaries of topic areas in their speciality. Such a facility could only be possible with computer devices, but we have yet to see an easy marriage between electronic information systems and the day-to-day practice of the physician. Future generations are more likely to accommodate computer devices into the information needs of their daily work, and the inclusion of the database of frequently-updated reviews would be an appropriate goal. The value of any medical information, however, will still depend ultimately on the quality of scientific observation and the competence of the medical reviewer.

Electronically-pooled medical experience

A component of doctors' specialist knowledge comes from the accumulated experience of the cases they have met. An ambitious attempt has been launched in 1985 to capture such experience electronically. In a scheme called *Clinical*

Notes On-Line (CNOL) the medical community is invited to submit to a database short clinical summaries often involving a suspected or definite case of adverse drug reaction. Each case history is likely to contain a single though usually novel observation from conventional medical practice. The contribution to medical knowledge of any one case will be modest; the value of the system should emerge as hundreds or perhaps thousands of case histories are accumulated in a structured electronic index available for online interrogation by clinical users. It is hoped that an individual practitioner confronted with a seemingly new problem may through the database take advantage of the experience of a wide medical community to discover whether such a case has in fact been met before. *CNOL* is intended to be an electronic version of the senior clinician who from the depth of his or her experience is able to reflect on 'When I saw a case just like that some fifteen years ago'.

Proponents of this scheme also argue that hitherto unnoticed patterns of disease or its response to treatment may emerge through the structure of an electronic database applied to what is effectively an extensive observational study.

It should be noted that this intriguing concept is yet early in its implementation. It remains to be shown whether the clinician finds it to be as of interest and value as is hoped by its designers.

In essence

Doctors use information extensively. And in the world of medical information handling there is an undoubted increase in direct user involvement facilitated by the availability of small and relatively inexpensive computer systems. Improved techniques and standards for communication, and the opening of direct links to international bibliographies further encourage this approach. But the medical librarian will continue to play a key role, as a source of expertise in accessing specialist information, and as a skilled adviser to users who wish to play a more active part themselves in electronic information technology.

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Medical statistics: overview

Michael Alderson

Chief Medical Statistician, Office of Population Censuses and Surveys (OPCS), London

Paper presented at the Aslib Biological & Agricultural Group seminar 'Medical Statistics', Guy's Hospital Medical School, London, 29 November 1985.

Introduction

This paper begins with a discussion of definitions of certain terms to be used, and clarifies the scope of the presentation. It then turns to aspects of libraries and users to clarify the services that may be required. The third and longest section briefly covers the different sorts of data that maybe available in or via libraries under the umbrella term medical statistics, and points to other sources of material.

Definitions

For the purposes of this presentation, medical statistics should be thought as encompassing: mortality; morbidity in the population; staff, facilities, and cost of health care; workload managed by the health and welfare services. Rather different is the types of material that could be accessed in a library. There are four rather different topics:

1. national statistics;
2. key review articles;
3. use of *Index Medicus* to identify specific articles of interest;
4. a more extended and general literature search. The type of assistance required will very much depend on the enquiry, and also the background of knowledge of the library user.

In facilitating use of medical statistics, there are a number of guides to available official and other statistics; there are also various books on the method aspects – both of sources of data and categories of use. As far as the statistics themselves are concerned, it is important to distinguish the holdings of primary sources of material, from the secondary sources which often have digests of material in a condensed form. The latter have the advantage of making complex data sets readily available, but the constraint that the user can only make use of the format and presentation from secondary sources (in contrast to the flexibility of utilising basic and detailed tabulations from primary sources).

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Aspects of the library and its users

The facilities available will vary with the location of the library. For example, one would expect quite different holdings of medical statistics in libraries located in: universities; medical schools; regional health authorities; a postgraduate centre in a district general hospital; local authority public-lending libraries; specialist medical libraries (such as exists in professional societies as the Royal Society of Medicine, the British Medical Association etc); and miscellaneous libraries.

The user will also influence the topic, and the types of data that will be required. Very different uses will be demanded by doctors in clinical practice, research workers, nurses, administrators, and others using library facilities. The type of data required, the time span, the relevance to local problems, and other facets of the data will be markedly influenced by the category of user.

Different users will require quite different library support. Some merely wish for open access to the data, particularly in libraries that they know, or where there is clear signposting to the sources of primary data that they wish to consult. As already indicated others may require guide to sources of material, or they may want assistance in interpretation either through talking to someone in the library, or being provided with a method text which facilitates such activity.

As far as direct access of the data are concerned, the range of availability of material is now wide. There may be on the shelves in the main library printed tables or microfiche (the latter immediately facing the user with a rather different problem). If the data are not available on the shelf, there may be an open-access stack that the user can enter, or the material may be 'archived' and not available the day the user walks into the library. For certain statistics, there may not be data in the first library of contact or another nearby library, and there is need to use data from central holdings. Such material may either be borrowed, or photocopied if the user knows exactly the detailed specification of the table required. There is a minor move at the moment to make some central material available through viewdata systems, or even consideration of the user accessing files of data through a computer terminal. However, these are mentioned as aspects of access that may radically change in the future with the spread of innovation in information technology. In the interim, before availability of computer terminals accessed to central files, the user may be able to specify and request ad hoc analyses which are produced in batch mode from central holdings on mainframe systems.

As far as guides to medical statistics are concerned, there was an official statistics guide to the Central Statistical Office (CSO) publications, produced in 1976. A brief guide to current material is provided annually by CSO, and some additional particulars are released in the quarterly statistical news. Her Majesty's Stationary Office (HMSO) provides weekly and annual listings of government publications. Rather different are the purpose-written reviews on sources of statistics; ones of particular relevance to the health and welfare area are: *Reviews of UK statistical sources, Volume 2 – central government routine health statistics* (Alderson and Whitehead, 1974), and *Volume 9 – health* *surveys and related studies* (Alderson and Dowie, 1980). Edwards[1] produced a review of sources of social statistics, and Pickett[2] produced a review of sources of official data. Analogous to the need for guides to such statistics are the relevant data on method. Textbooks on epidemiology frequently have chapters discussing the availability and use of such statistics. A somewhat different aspect is the need to understand some appropriate detail of statistical method applied to medicine, which is dealt with in textbooks on medical statistics.

Data on medical statistics

The main primary sources of medical statistics are: England and Wales – OPCS and Department of Health and Social Security (DHSS); for Wales some additional health statistics are published by the Welsh Office; for Scotland data are published by the Scottish Home and Health Department, and the General Register Office; equivalent of Northern Ireland is the Department of Health and Social Security, and again the General Register Office for Northern Ireland. The main source of international data is publications from the World Health Organization (WHO), with more limited data from the United Nations publications on demography.

As far as OPCS is concerned it is worth emphasising that there are a range of activities which can result in: publication of routine statistics without or with interpretation; other activities may involve special studies, utilising our data either for internal 'case-control studies' (e.g. the risk of soft tissue carcinoma in farmers and other workers), or the long-term follow-up of various subgroups of the population (e.g. the follow-up of occupational groups such as hairdressers identified at the census to examine patterns of mortality). In addition to the publications that flow from such work, the staff are heavily involved in giving advice to users of such material, preferably through correspondence, but in certain circumstances over the phone or to visitors. This advice may include the provision of unpublished material (either more detailed data that can be readily published, or provisional release of material being prepared for publication). There is a rather different facility for assisting in follow-up studies, and staff in the division provide assistance with such work. This is however beyond the terms of reference of this presentation.

As far as mortality data are concerned, the material may be released by OPCS either in weekly or quarterly, or occasional monitors. There are a series of annual review volumes for the five main topics in which mortality is divided, and some of these are accompanied by additional material on microfiche. Following each decennial census, it has been traditional to provide supplements with extra data on mortality by area, by place of birth, and by occupation.

In addition to releasing the data in the above way, and answering specific enquiries, OPCS provide tapes of mortality each year to the regional health authorities in England and Wales. They inform, at regular intervals, the district health authorities (DHA) about deaths occurring outside the locality of each DHA. In certain circumstances, special tapes may be released for research purposes.

A major source of other data from OPCS relate to the topic of *morbidity* – these are the series that deal with specific medical problems. OPCS currently handle data on abortions, cancer registrations, congenital malformation notification, hospital discharge (for all discharges excluding psychiatry), periodic studies on morbidity in general practice, and notification of infectious disease. Again the statistics from these series are released in monitors, annual reference volumes including major release on microfiche for hospital discharge statistics, provision of unpublished material, and answers to various ad hoc enquiries. The release of detailed data will depend on satisfying aspects of confidentiality and ensuring that no release of named data occurs without clearance from appropriate ethical bodies.

There is not the volume of data so readily available for morbidity statistics as for mortality at the international level. The major exception is for the historical series covering infectious disease which are published in the WHO statistics annual[3]. The International Agency for Research on Cancer (a special body operating on behalf of WHO) provides periodic volumes on registrations of cancer in the five continents of the world. Much more limited data has been published on hospital discharge for selected countries, and even less material on morbidity in primary care.

DHSS have published a range of statistics on workload in the health service, and also on facilities including staff etc. Particularly detailed have been their publications in the field of mental illness and handicap (including publishing in-patient statistics for this field). This has now been expanded by the production of data on performance indicators, which are released directly to health authorities, including some material suitable for use on microcomputers. As with OPCS, publication of some statistics in the equivalent to monitors has now begun.

Before finishing a presentation on medical statistics accessed in libraries, it is important to mention that there are a number of specific problems with such use, including validity of the data. Though these are acknowledged, it is left to one of the later speakers who is dealing specifically with this issue. The one point that is worth bearing in mind is the continuing question whether information to answer a user's enquiries is best provided from available routine data, as a result of a continuing survey, or from the results of a specifically-planned and carried-out, small-scale survey.

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Morbidity statistics

John Fry
General Practitioner, Beckenham, Kent, UK

Paper presented at the Aslib Biological & Agricultural Group seminar, 'Medical Statistics', Guy's Hospital Medical School, London, 29 November 1985.

Introduction

I am going to give you a really personal paper – personal because its based on my experiences, delving and fighting my way into the morass on morbidity data and all there is to get, and trying to put it into some order. To paraphrase Shakespeare's Mark Anthony 'We only die once' that's *mortality* 'but before we do we suffer many ills' and that's *morbidity*. The frequency and the cost of morbidity is more important than mortality which is a very final exit. Therefore logically we need to know very much more about morbidity than mortality but however, and I suppose that's the reason for this meeting, collection and trying to get morbidity statistics is difficult as Michael Alderson referred to in his paper (*see* pp.183–186).

There are problems recording morbidity statistics. The difficulties are first the diagnostic imprecisions on labelling and recording in spite of the ICD (the International Classification of Diseases of the World Health Organization (WHO)). There have been studies, particularly on death certificates to show the gross inaccuracy of mortality data. The differences in relation to the collection of morbidity data are just as great if not wider. Next there is observer variation and keeping to the same definitions and the same guidelines. Another massive problem is the whole mass of morbidity. A further problem is that there are very many places where morbidity is seen. It is not just in general practice – general practice as I will show you in a moment may be the portal of entry into the medical system, but also by pharmacists and other para-medical workers who provide care. There is no system that can cover the whole of morbidity. Even in Scandinavia with their much smaller populations and more sophisticated ways of recording morbidity they can't get at everything.

There is no co-ordination or correlation or direction or control over all these sources. A criticism of the health service is that there has been no attempt to try and get at this data and to use it for management policies.

Levels of care

To get even more basic look at the systems and the levels of care in any society. There is a simplistic model of levels of care in British society. There are

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basically four levels of care, four levels of corresponding population and four levels of corresponding administration. Levels of care are very important in relation to morbidity and any other forms of data collection.

The first level is the one that doctors tend to forget till sick themselves and that is *self-care*. And the level of self care is by far and away the greatest of all. If you take all the people suffering from symptoms at any one time, less than one in four will go to the next level of care which is called the *primary health care level or general practice in the UK context* or the first contact or first professional level. The next level which is also inevitable in all health care systems is *general specialist care*, the level of the DGH – the district general hospital. General professional care is the level of the general physician, the general surgeon, the general paediatrician and normally other general specialists. The final one is *super specialist care*. The level of the neurosurgical unit, the cardiothoracic unit and others.

You can already fit this into *regions, into districts, into localities, and into the family*. And then the other important matter to understand is the *population basis*. And the population base of the *region* may be five million; the *district* is usually a quarter of a million; in *general practice*, the average list per general practitioner (GP) is about 2,000 – and a *family* can be anything from one to ten or whatever size is a family. If you can understand these levels of care in a health care system it will then help to see where the morbidity statistics come from. The *level of self-care* is the level of the *General household survey*. It's the level of the studies done by the pharmaceutical industry, by sociologists, it's what patients and what the public think about and what they do for themselves. It is certainly of very great interest to the pharmaceutical industry and it should also be of great interest to the rest of the health care system because the more efficiently and the better health care prevention is carried out at that level then the better for the whole of the system itself. Each level has its own features but if you want to study them, there are similar principles in terms of recording. You have to relate it to the population basis to get the prevalence and the incidence rates. You have to understand that each level has its own common pattern of diseases or common pattern of morbidity.

Now what is common in my practice is certainly different to what is considered common in a regional neurosurgical unit. Whereas I see perhaps, one brain tumour every five to ten years, there they probably operate on two or three a week. The reasons are different population denominators. An important way of looking at morbidity then is to look at the whole disease the whole mixture of a disease that a population suffers from and then to relate it to the different population levels.

Natural history of diseases

At Guy's Hospital I learned 'Common diseases commonly occur and rare diseases rarely happen'. This was a most important lesson. The other lesson I learned from John Ryle, Consultant Physician at Guy's, was also in relation to morbidity, on the natural history of disease – working in Guy's Hospital wards it occurred to me that a hospital only provides you with an instant snap-shot picture of disease. It was only when I went into general practice that I was able to appreciate the importance of the long-term pattern of disease. It is this dimension of time that is very particular to the field of general practice. It is only there that we can study what happens to hypertension, to children with coughs and colds, to multiple sclerosis and other chronic disorders. This aspect of morbidity is not often studied or recorded.

Morbidity in planning

It is important that we know of this common morbidity and we have a certain administrative structure based on morbidity, recording analysis and application. It offers a tremendous opportunity in helping us to manage and to plan, to assist us to make the best use of resources. It should be of use to us in budgeting as referred to by Nicholas Wells[1], and it helps us to quality evaluate and audit. The Royal College of General Practitioners has taken on the task of looking at quality but it is at all these levels, not just at the level of general practice, that quality evaluation and audit ought to be carried out, not only in relation to morbidity but also in relation to patient awareness, patient demand and patient needs.

Morbidity is also important in trying to tell us something about prevention because after all doctors are in the business of trying to prevent morbidity and mortality as well as treating it. It is also important in terms of health economics and manpower. We need to know something about the prevalence and incidence in relation to trying to help us to decide how many nurses, how many doctors, how many librarians perhaps we really require for our needs and the wants of our community.

Some sources

The Royal College of General Practitioners publishes occasional papers on morbidity, and Margaret Hammond, the Librarian, is a very good source of information in relation to morbidity statistics from a general practice. Another body with which I have been involved for a long time is the Nuffield Provincial Hospitals Trust. In November 1985 an occasional paper appeared, edited by John Ashley and Gordon McLachlan entitled, *Mortal or morbid: an analysis of morbidity statistics.* If you want references about morbidity statistics then that is the booklet to note. My criticism of the Office of Population Censuses and Surveys (OPCS) and the Department of Health and Social Security (DHSS) is that they don't make it easy for an ordinary reader and an ordinary librarian to try and get their hands on what is really useful. There is a need for someone to take us by the hand and guide us through all their publications in a very simple manner.

The two I find particularly useful are *Health and Personal Social Services Statistics,* a mine of information on the health service, and also manpower and morbidity. The other one that I find very useful *is Social Trends* which is published by the Central Office of Information, a very good source of morbidity particularly in relation to social problems.

Personal data

I qualified from Guy's in 1944 and I went into my practice in 1947. I say that because 1947 was the year before the National Health Service (NHS). The NHS has been a tremendous boon to the population and to general practice. But I say this as background because I went into general practice knowing almost nothing about it – the only thing I really knew was the fact that I'd lived in a GP's house since I was very young because my father happened to be a GP. And of course training at Guy's and other basic training. So I jumped in at the deep end and at that time there was no literature on general practice. All there was, was Conybeare, a physician at Guy's who produced a very good medical textbook, a few other basic books, and *The Practitioner* which was going then and it still goes on recording data.

I had to teach myself about general practice, I did it very simply by collecting some data. The other good fortune was that it was before medical statistics had been invented as I knew them. It was a long time before computers were invented and it was a long time before I began to know anything about epidemiology. I had to develop a very basic form of data recording which I still use and which does not require a computer, does not require machines, and does not require microfiche. It just requires two resources – a pencil and paper, and information. It takes ten seconds per consultation to record the data, it takes one of my secretaries about half-an-hour a week to transfer it into a meaningful form to analyse it.

What does it consist of? Very simple, it consists of an *Age/Sex Register* which provides an age/sex breakdown of the population, the denominator. A *day sheet* to record in one line the face-to-face consultation, the person's name, sex, age group and the main clinical diagnosis, whether you refer it to hospital, for X-ray or pathology. All this gives data on the volume of work, on the nature of the work, the age/sex distribution in relation to consultations. More importantly, more simply, and more easily is it possible to collect *data on specific diseases.* And how do you do that? Nothing could be simpler – I have a little notebook in my drawer with 'A,B,C,D' at the edge and each letter refers to a disease, 'A' is hypertension, and as I diagnose a new hypertensive I enter the name. The same for coronaries or epilepsy or neoplasm or whichever diseases you are interested in. If you do that it takes a minute a day. At the end of the year one of my staff places the names into card index boxes with separate boxes for hypertension, for coronaries, multiple sclerosis etc. The third method is *clinical records* which are part of the NHS. Now, if you have got data on what goes on in terms of volume of work, and if you can record all your duodenal ulcers, you can begin to build pictures and profiles of the common diseases and so on over the years. Because it was simple, because it was cheap, because it was useful, we collected this data and what has it provided? It provided not only for me but for my colleagues a map of and information about what goes on in general practice.

Let me briefly touch on some of the fascinating applications of morbidity recording. To take two examples: The first one is one that got me into trouble over the years. The first time was when I edited a publication for the Royal College of General Practitioners called *Present state and future needs.* That was the first edition and I'm surprised it ever got beyond it – it's now in its sixth edition. The first edition was based on my own figures and also some of other GPs who collected simple information in their own practices and they worked out the annual doctor patient consultation rates to which Nicholas Wells referred[2]. If one knows how many times a patient sees a GP, if one knows the population at risk then if there are 2,500 patients and the number of face-to-face consultations in the year adds up to 10,000 then the annual consultation rate is 4. One can then divide the rate into weeks, and into days and work out what this anonymous GP does. The other person who got into trouble in 1984 was Professor David Metcalfe of Manchester who suggested that GPs only have a twenty-hour week face-to-face with their patients. In 1962 in the first *Present states and future needs,* I suggested exactly the same figure and it is a fact that the face-to-face consultation time per week is about twenty hours, or even less. That doesn't mean that GPs only do that, they also do home visits and other tasks. It does begin to give an insight into the consultation and it raises questions on medical manpower needs and other issues.

Patterns of disease

Another application of morbidity statistics in general practice is the one I referred to earlier; the long-term dimension in relation to disease. When I examined age prevalence rates of the common diseases I discovered that there were five patterns of disease in the community in relation to age and time. These are *diseases of aging* that become more prevalent or more severe as people get older. These are the cancers, the hypertensions, the osteoarthritis, and the like. There are *diseases which are prevalent in children and they outgrow.* These are important because it raised in my mind in the early years the 'non-need' for tonsilectomy and adenoidectomy. In the 1930s 90 per cent of boys going into Eton College had had their tonsils out and also had been circumcised. A study compared with new social class places like East Ham and Bermondsey showed the rate of tonsilectomies per population was less than 20 per cent. It was really a social procedure, a social operation for the benefit of the doctors rather than for anyone else but it is part of what I call the 'catarrhal child syndrome', coughs, and colds, earaches, sore throats, wheezy chests from the age of nought to ten. Children reach a peak of coughs and colds between the age of four and seven and then just outgrow it. It must be related to natural immunological processes in the lymphatic system. Another important group of diseases are those that *start in the late teens and early twenties, reach a peak and then they become less prevelant in middle age* e.g. migraine, asthma, urinary tract infections. To complete the picture there are some diseases like cystic fibrosis or other congenital disorders that remain unchanged. There are certain conditions which are most prevalent in the *young and the old.*

Own publications

My book, *Common diseases* (1985) is now in its fourth edition. It was based on my pencil and paper research on morbidity data. *The NHS data book* (1984) was written with David Brooks, a GP, and Ian McColl, the professor of surgery at Guy's. We wanted to show how to provide meaningful information out of all the mass of DHSS, OPCS and other statistics, and to try and reduce it into simplified format. It consists of few words and many diagrams on morbidity and other data.

It is important to collect data and to publish them, but to produce them in a meaningful form for the ordinary reader, to be easy on the eye and carry messages that are useful and understandable.

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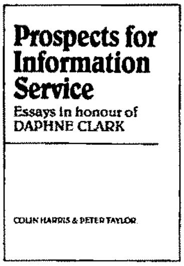
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The West German information policy: results of the first and plans for a second governmental programme

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Paper presented at the Association Belge de Documentation colloquium, 'National information policy', Brussels, Belgium, 14 March 1985.

The Government of the Federal Republic of Germany was engaged upon formulating an information programme for the years 1985–1988 when I delivered this paper. (Since then the Program has been published and is also available in English). While this will result in a new orientation of governmental activities in this field it will of course rely on developments and experiences of the past and cannot be understood without knowing them. Therefore I will start with giving you this background especially with respect to the first programme for the Promotion of Information and Documentation, the so-called IandD-Programme of 1974. Then a short summary of the situation will be given as it has developed within and after this programme. And this will be the basis on which to discuss current activities and planning.

In the course of this paper I cannot go into many details of the manifold private and public information and documentation activities. I rather will concentrate on the main governmental issues of information policy in West Germany.

Broader governmental interest in information and documentation arose in the early 1960s when the Federal Audit Office came to the conclusion that information and documentation – being essential to improve the efficiency in science, industry and administration – should be seen as a public objective and should be therefore promoted in a similar way to scientific libraries. At the time of this recommendation people in all industrialised countries were aware of the so-called information flood and that technical means like data processing and reprography were increasingly introduced into the documentation process to master this problem of quantity and quality.

An important follow-up of the high-level recommendations was the establishment of the Institute for Documentation (IDW) which was to co-ordinate public activities, to give advice to governmental and private institutions and to help financially by giving grants for setting up new documentation centres and also

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for singular projects.

Those projects could be the development of thesauri or classification schemes, the introduction of modern techniques for data recording, storing, printing etc. – the start of new services and the like. From the beginning much attention was given to the education and training of documentation staff and last but not least to close relationships with foreign and international institutions.

An early offspring of IDW was a special Centre for Mechanisation in Documentation (ZMD) to help German information centres to become acquainted with data processing methods and to take over services for them in this area. One of the larger projects which I would like to mention became the mechanisation of the German national bibliography which later resulted in *BIBLIO-DATA*, today one of the biggest German databases with more than 100,000 entries per year.

During the 1960s and early 1970s many new activities started, others were improved. They finally formed the basis for a concentration process, initiated by the federal government with its IandD-Programme of 1974. Besides financial measures the programme aimed at an overall new structural concept for information and documentation in West Germany. This structural approach foremost caused much attention not only within West Germany but also abroad. It foresaw the creation of information systems in sixteen subject fields, each with a central organisation, the so-called *Fachinformations Zentrum (FIZ)*. An additional four centres were planned for problem-oriented areas.

Table 1 shows those twenty fields with a short indication of their subject scope.

The FIZ should be technically- and economically-viable entities. They should ideally cover most of the information and documentation activities within their scope from literature and data evaluation up to the offer and dissemination of various information services including online retrieval which started to become of increasing importance at that time. They should also be responsible for the co-ordination of other activities within their scope and for possible co-operation with other centres, and with foreign and international partners. As a rule the FIZ should be based on already-existing IandD-Centres.

This structural plan was considered a rather ambitious one from the beginning. And indeed, it was not fully realised even by 1985. The main reason for this was the changing economic situation but also new technical developments which influenced progression.

Not only the federal government but also the state governments and industry, which were invited to share responsibility and financing, were in the end no longer in the position to set up new FIZ.

Looking at Table 1 again you get an indication of the successes and the shortcomings. Under 'Information Centre' I have listed those centres which have been created as a FIZ and carry that attribute in their name, and I have added others which fulfil functions similar to those other FIZ. The column headed 'Sponsors' shows that in all cases government is still needed as a sponsor even for those three centres for whom the main responsibility lies with industrial groups.

It was the intention that the FIZ become self-supporting by selling their products and services at adequate prices. But in most cases this will be a rather long process. One of the problems in this context is certainly the German language, as in many user groups information is needed in German, but on the other hand databases in the German language will only have a limited distribution internationally.

TABLE 1. *Structural objectives of the IandD-Programme: planned information systems and realised FIZ (Scope and the names of the centres are abbreviated).*

	Scope	*Information Centre*	*Sponsors*
1.	Medicine	DIMDI, Cologne*	Government
2.	Agriculture	ZADI, Bonn	Government
3.	Chemistry	FIZ Chemie, West Berlin	Federal and State Government, Scientific Societies
4.	Energy, Physics	FIZ Karlsruhe*	Federal and State Government, Scientific Societies
5.	Materials	FIZ Werkstoffe, West Berlin	Industry, Government
6.	Earth Sciences	GEOFIZ, Hannover	Government
7.	Transport	—	—
8.	Building	IRB, Stuttgart	Government
9.	Consumer Goods	—	—
10.	Economics	—	—
11.	Law	JURIS, Bonn*	Government
12.	Education	—	—
13.	Social Sciences	IZSozialwiss, Bonn	Scientific Society, Government
14.	Humanities	—	—
15.	International Relations	—	—
16.	Engineering	FIZ Technik, Frankfurt*	Industry, Government
17.	Patents	—	—
18.	Current Research	—	—
19.	Environment	UMPLIS, West Berlin	Government
20.	Standards	DITR, West Berlin	Industry, Government

* = host operators

The picture of the German information scene of the mid-1980s would be incomplete without mentioning the still-growing number of mostly-smaller information establishments often within institutions and enterprises. A compilation from 1982 by GID describes more than 650 of them.

To fulfill the information needs of their customers they now increasingly rely on services of the FIZ and especially on the numerous bibliographic and numerical databases for online retrieval offered by German and foreign hosts.

Besides promoting the FIZ as just described the IandD-Programme also considered the *infrastructural* background, for example, scientific research in information and documentation, education and training and standardisation. Here as in the FIZ case a concentration took place which resulted in the creation of the *Society for Information and Documentation (GID)* in Frankfurt by the federal and state governments. GID incorporates the already-mentioned IDW and ZMD together with institutes dealing with systems analysis and non-numerical data processing, and it took over the library and documentation centre of The German Society for Documentation. In Table 2 I have listed the objectives of GID.

TABLE 2. *Objectives of the Society for Information and Documentation (GID).*

- to conduct applied research and development in information and documentation;
- to give advice to its corporate members, information centres, etc;
- to provide technical services e.g. data processing and reprography;
- to support the exchange of knowledge and learning in information and documentation;
- to manage research grants given by the federal and state governments for IandD;
- to support international co-operation with respect to information and documentation.

But research and development was also stimulated and funded outside GID and as an important outcome of this, academic institutes for information science were installed by the state governments at the Universities of Berlin, Dusseldorf, Constance and Saarbrucken.

Besides their research activities they – together with some further training institutions – will prepare their students for the manifold tasks in private and public information-handling organisations.

Let me close this description of the results of the IandD-Programme by just mentioning some efforts undertaken to bridge the often-criticised gap between the information offered by online services on the one hand and the user requirements on the other. Here I should name the introduction of the Common Command Language by the German hosts which reduced the number of different retrieval languages. Of help to the user will also be the implementation of a document-ordering capability which has come into effect. In this context attention should further be given to some information intermediaries which were started as pilot projects and one question is to what degree such activities are necessary in the long run, and can form a basis for a self-supporting market segment. This observation directly leads to the last part of my paper. As information policy in West Germany is seen as part of the general research policy the following programme will be based on the principles of that part of governmental activity. In Table 3 you find some of the main principles and the objectives of the next programme.

TABLE 3. *Main principles and objectives of the Information Program 1985–88.*

Principles

- As a rule: within the social market economy the production and dissemination of information is an activity of private enterprises and therefore underlies private initiative.
- Public promotion can be considered in selected areas where the market regulations for the provision of information are not (or not yet) sufficient (principle of subsidiary responsibility).
- For the performance of public functions and requirements it may be necessary for governmental bodies to produce, store and disseminate information. But it has to be decided in each case, which of these functions government should perform and which should be given to private enterprises.

Objectives

- to improve the development of an information market;
- to improve German information services within international co-operation and competition;
- to enhance the usage of information in science, industry and administration;
- to intensify the information transfer from science and research into industrial application.

This is clearly a new orientation of our information policy compared to the first IandD-Programme where governmental responsibility and initiative were primarily called upon.

But nevertheless there still remain many activities for the government, and in Table 4 I have indicated some measures which have been deduced from the objectives which have just been discussed.

It is expected that private enterprises will increasingly play their part in the development of an information market. This is especially addressed at publishers and private information brokers.

Federal money for the new information programme will amount to roughly 1 per cent of the total research budget, and the aims of the programme will contribute to other areas of governmental activity but will at the same time profit from yet more areas. I will only name the programmes for data processing and technical communications and the development of a nationwide research network, or on the other side the efforts to improve technology transfer and the innovation process for industrial production. The parallel programme of the German Research Society, which aims to organise the system of scientific libraries properly, so that they are ready to play their part in improving the overall information process, is very important in our context.

TABLE 4. *Main measures of the Information Programme 1985–88.*

- development and improvement of databases and databanks in selected subject fields e.g. chemistry, physics;
- improvement of the online services offered by German hosts and hosts with German participation e.g. STN International;
- participation in the European Communities' programme on electronic publishing e.g. full text patent databank;
- research and development in information science e.g. participation in the EUROTRA project of the European Communities.

As in the first programme the numerous cases of international co-operation on governmental and non-governmental levels are estimated as very important. As already expressed in the objectives, international partnership is seen as a prerequisite for solving the problem of the still-increasing quantity of information and the diversifying demands of users. Most German information centres already rely heavily on their partnership with foreign institutions, and the government itself takes an active role in international governmental organisations. One of the most important ones is the European Communities and its various action plans for the development of a european information market, and there is also, for example, OECD (Organization for Economic Co-operation and Development) and Unesco.

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Information policy in the Netherlands

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Introduction

I am delighted to have this opportunity of speaking to you about the *informatieverzorgingsbeleid* (literally, policy for information provision). After a few general remarks and a little bit of history, I would like to tell you something about the overall structure of information facilities in the Netherlands, with a particular emphasis on the political aspects of information. Using this as a starting point, I'd also like to say something about what has been achieved so far with an at least partly-deliberate information supply policy. And to finish, I must tell you something about plans for a changed approach, and try to explain why that is and why I find it such a pity it is that it causes so much trouble in terms of lost time and personnel.

Information structure

I quite deliberately used the words documentary information, realising full well that during this conference the usual confusion has arisen about: what are we talking about, do we mean documentation or do we mean information. Well, I'm inclined to say that we mean both: we're all concerned with documentary information. This sounds like a compromise, but there's one thing we must be quite clear about: we're not talking about communication, and in particular, we're not talking about mass communication. If we try to take that in as well we'll never get anywhere. This term, documentary information has already won widespread acceptance in the Netherlands amongst people actively involved in the profession and in official circles. Until the early 1980s, each ministry concentrated on documentation relating to its own specific area of responsibility and geared first and foremost to its own needs. Having said this, the information is almost always freely accessible to the public, though in a few rare cases special conditions have to be met. But there was actually no real policy as such: each ministry developed whatever it needed for its own purposes and didn't even dream of any sort of co-ordination. In actual fact, there was absolutely no interest in a national policy, only in individual requirements. True, a permanent committee for documentation in the public sector was set up, in which these issues were raised, but it never led, for

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instance, to what you or I might think was the most important thing of all: clearly demarcating the boundaries of information activities.

Alongside this committee, there was also an institute called the *Nederlands Instituut voor Informatie, Dokumentatie en Registratuur* (Dutch Institute for Information, Documentation and Recording Systems), which was disbanded just before its 60th jubilee and incorporated into a semi-public body. Semi-public in this connection means that it follows all government directives, and all its funding and finance comes from the government, but that most staff are not civil servants. This has its advantages, and its disadvantages too.

So it was that in 1971, the *Nederlands Orgaan voor de Bevordering van de Informatieverzorging,* the NOBIN (Dutch Organisation for Information Policy) was set up by the government in direct response to the fact that for the first time ever, the government was (at least partially) aware of the need to arrive at an information policy, more specifically through the provision of advice, co-ordination, incentives and finance. The government, then, assigned these duties to the NOBIN.

The one fly in the ointment, however, was that four years later, in 1975, a library council was set up which right from the outset duplicated the advisory function of NOBIN as far as library developments, some of them very modern, were concerned. In practice this duplication turned out better than expected, but it was still one of the reasons underlying later attempts to find another solution.

As far as structures in the Netherlands are concerned, I shall try to be as brief as possible – I certainly don't wish to set myself up as the ultimate authority on technical developments in the Netherlands. It would suit me better to concentrate on the policy aspects, but I still need to make a short detour into the structural features – the national structure in the Netherlands – before returning to a brief description of the NOBIN.

A number of professional associations can be identified in the private sector which, to put it in a nutshell, aim to promote professional interests, often to the exclusion of everything else, through exchanging experiences. These associations are very informal and relaxed gatherings, where the same people get together regularly and where you can hear about all the new developments, but there is no way in which they exert any sort of pressure on the government as far as an information policy is concerned. To my mind, that is a very real shortcoming. These associations are the *Nederlandse Vereninging van Bibliothekarissen, Documentalisten en Literatuuronderzoekers* (the Dutch Association of Librarians, Documentalists and Literary Researchers), *the Nederlandse Vereniging van Bedrijfsarchivarissen* (the Dutch Association of Business Archivists), the *Vereniging van Archivarissen in Nederland* (Association of Archivists in the Netherlands) and the *Nederlandse Koninklijke Bibliotheek* (Dutch Royal Library) and *Vereniging van Universiteitsbibliotheken* (Association of University Libraries), but that is more of a consultative body. Then you have the *Studiekring voor Overheidsadministratie en Documentatie* (Study circle for Public Administration and Documentation), representing all the libraries and archives in the Netherlands, especially those belonging to the 800 local authorities. An interesting sideline is that all the local authorities use the same classification system in their archives and libraries, based on the Universal Decimal Classification (UDC). While there is not overmuch co-operation between these organisations, there are some positive aspects: at least some of them publish a joint periodical and many of them have launched joint efforts, initially to set up training schemes and later to set these schemes in motion via new organisations. So much for the non-government sector.

Turning now to the public sector, as regards the drafting of policy we are basically concerned with three organisations: the *Bibliotheekraad* (Library Council), the NOBIN, and the Permanent Commission for Documentary Information in the Netherlands, which is however exclusively restricted to information-related issues within the ministries. As for the government itself, I have already said that all the ministeries are involved in information, but this still does not mean that they have addressed themselves to an information policy.

To avoid spreading responsibility for information policy over the whole range of ministries, the Parliament resolved that the minister for education and science would be the co-ordinating minister for information policy. Consequently, this is the first person to go to; before this there was a separate minister for scientific policy, who was then the co-ordinating minister. Obviously, the minister also liaises with other ministers insofar as this is required. In practice, the minister for economic affairs plays a very important part in this respect – a very encouraging sign to my mind. At this point I should like if I may to break off and give a short description of NOBIN. It has a committee in which various different interests are represented: science, business, government and information – the professional world, in other words. To get a better feeling of what is going on 'in the field', there is an advisory commission for the co-ordination of NOBIN's information activities at national level, which makes recommendations via the NOBIN committee to the government. In fact, the whole active profession is involved in this commission. Though it is expressly stipulated that people from organisations and associations take part in a personal capacity, the presence of the organisation is still felt in the background to a certain extent. I can tell you (and I find this most encouraging) that the 'policy for information provision' receives a great deal of attention in parliament. However, this does not always mean that rapid and effective measures are taken. But in any case, the awareness that someone is doing something about the information problem is encouraging in itself.

Achievements of the NOBIN

You may now be wondering what NOBIN has managed to achieve. Allow me to begin by drawing your attention to a number of very comprehensive information projects, most of which we started directly in 1971, especially at the time of prosperity when we got a grant of almost ten million guilders for the first year. That was an enormous amount, especially if you realise that up until 1971, the only financial backing the government provided to support and encourage the information policy was a yearly subsidy of 100,000 guilders granted to the previous institute, NIDER. From 100,000 to

10 million is a big jump. A lot of major projects were launched at that time, some more interesting than others, but all of them providing valuable experience: a large-scale hospital information system – automated, naturally – to which all the big hospitals and university clinics are linked up, even, so I've been told, a hospital in Belgium. Everything to do with patients is automated – diagnosis, therapy, diet, laboratory tests and so on and so forth. A similar large-scale project also exists for pathological and anatomical applications. The national cancer register is part of that project. Coming closer to our professional field, we have PICA – an automated integration of the cataloguing systems of all the major libraries in the Netherlands – which gradually grew into a sizeable project involving forty-six staff in 1985. A national automated bibliography is also being set up via these automated processes, while an automated central catalogue for cartography is encountering considerable interest from abroad. Some of the retrieval methods of this project have been adopted by the Library of Congress. Apart from that, there is a whole range of smaller projects in the fields of agriculture and economics, far too many to list here.

Secondly, you may be wondering what we have achieved on the training front. There are six colleges of library and documentation studies of virtually equal standing in the Netherlands, with a considerable student population. In addition to that, there is a part-time course, also on a fairly-large scale, which is the common-core course leading to a qualification for business archive and library work and literature research. To continue, we have a fairly small post – the only one at university level – at the University of Amsterdam, and that is for postgraduate training. There is also a course for scientific archive work in the Netherlands. That was just to inform you about the general background. NOBIN's role was to report to the government with advice and recommendations in a bid to bring matters more in line with modern developments. It also initiated awareness campaigns in an attempt to arouse greater interest in secondary schools and polytechnics about the need for information. One development is a training programme to be launched for the scientific correspondents of newspapers, set up by NOBIN but carried out by another organisation. There are also calls for a course leading to a qualification as transfer agent (I shall be coming back to this later on – I've yet to find a good word for this but I hope you follow my gist) which is a joint venture by a college of library and documentation studies and HEAO, the *Hogere Opleiding voor Economisch en Administratief Personeel* (Higher Education for Economic and Administrative Personnel). This covers most of the training aspect.

In 1984 we carried out a very extensive survey into the use of information in small- and medium-sized enterprises, which I personally found extremely important. This yielded very striking results, and despite delays in implementing the recommendations, I am certain that before long the minister for economic affairs will take measures on the basis of this report to make information more accessible to the small business person. So the minister should, since the costs of the project alone came to a million guilders, financed direct by the minister for economic affairs without passing through NOBIN.

As far as classification is concerned, this is still handled – fortunately – by a Dutch classification foundation dealing with the basics of classification, UDC, obviously, and word systems, to name but two. At international level we are deeply involved with CIDST (Comite d'information et de Documentation Scientifique et Technique) in Luxembourg, we've got a National Commission for the Unesco General Information Programme and we're also reasonably involved with the work of the FID (Federation Internationale de Documentation). Apart from that there are a few other more recent, smaller developments in the research and (sometimes) experimental fields, mostly at the behest of ministries: a survey into the potential of automatic translation, at the same time intended as a contribution to the European Communities' Euratra scheme; a host survey into domestic and foreign automated information files to make them more readily accessible to outside users, and a fairly advanced document delivery system project with the help of the Apollo satellite.

The future

I would now like to say just a few words about the purpose of the reorganisation which is planned. Right at the beginning I said that there was a danger of duplication, especially in the advisory function, through the parallel activities of NOBIN and the Library Council. This danger has been recognised, and the reorganisation will lead to a state of affairs whereby just one organisation provides the government with advice, and advice only, on all developments in information, obviously including library developments. In other words, it takes over from the Library Council. Alongside that body, a new institute (NIBI) will be set up with responsibility for the stimulation of new developments and the co-ordination of all project implementations and undertaking projects in the form of experiments and research. The first step taken was the appointment of an external firm of organisational consultants to carry out an in-depth survey and try at long last to achieve a neutral approach. The basic principles of their report have been largely adopted. It's nice to note that the commission responsible for the new approach asked all the ministers: in which area do you feel that information activities should be encouraged, what are the priorities etc, all of this as something of national importance.

Conclusions

There are still more developments that I could talk to you about. But I'd like to leave you with one thought, which I realise is fairly idiosyncratic, but which I know that many of those who will shortly be deciding on the new approach share with me. It is this: I believe that the main focus of attention of a new information policy must be: to further the use of documentary information, especially for professional purposes, for educational purposes and not primarily, for the average person. Alongside this, special attention must be given to the immense category of small users, on the assumption that in large corporations and organisations it is possible to get along very well unassisted, but that the small business person, for instance, has little or no access to the unbelievable amount of information which, when it comes down to it, can be made available fairly easily. There is of course the need to repackage the information for the small users, the need to enlist the services of a transfer agent.

I'm assuming now that you understand the same as I do by 'transfer', i.e. through personal consultation with information users, to try to solve their problems.

La France – a-t-elle une politique de l'information?

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Je vous entretiendrai de ce qui tient lieu en France de politique de l'information. Je pense en réalité qu'il s'agit plutôt d'une non-politique de l'information et je vais tenter de vous expliquer pourquoi. Il faut pour cela d'abord caractériser la situation qui prévaut en France en matière d'information.

Peut-on en quelques minutes décrire l'infrastructure de la documentation en France? Si je le tentais, je préférerais ne pas commencer, comme a pu le faire Dennis Lewis pour la Grande Bretagne, par la Bibliothèque Nationale[1]. En France, en effet, la Bibliothèque Nationale est une vieille dame, un peu malade et dont il est devenu difficile de penser qu'elle puisse encore avoir un rôle dans une politique nationale. Mais je laisse cet aspect de côté et, pour m'en tenir à ce qui est dynamique, je dirai que nous avons, dans notre pays, des ressources nombreuses, importantes mais très dispersées, souvent mal exploitées et qui ne permettent pas d'atteindre une autonomie suffisante en matière d'information.

Que constate-t-on en effet quand on essaie de voir globalement les ressources existantes? On trouve beaucoup de secteurs spécialisés, quelques institutions documentaires importantes qui jouent un rôle relativement central, mais il n'y a jamais un organisme ayant une véritable fonction-pivot. Lorsqu'une centralisation est exercée, elle l'est toujours par substitution, c'est-à-dire qu'une institution, mieux organisée, mieux dotée que d'autres, priviligiée pour une raison ou une autre, joue un rôle qui ne lui appartient pas au départ et devient de facto un organisme ayant une fonction centrale dans son domaine. Je pourrais en énumérer dans toute une série de domaines particuliers, comme l'Institut Français du Pétrole, en matière de documentation pétrolière, etc . . . Les exemples sont nombreux mais il s'agit toujours de situations aléatoires; il se trouve que c'est comme ça; il n'y a presque jamais en cela réponse à une idée préconçue. A côté de ces grandes institutions, on trouve une multitude de services, de centres de documentation. Je note que nous employons encore beaucoup le mot 'documentation'; c'est par tradition, par héritage historique, et non pour des raisons philosophiques comme celles que Dennis Lewis exposait. C'est simplement parce que nous n'avons pas encore réussi à trouver un autre mot satisfaisant qui puisse exprimer la même idée sans recourir à une périphrase. Quand on lui cherche un substitut, on trouve toujours des expressions composées, même en anglais: Dennis Lewis était obligé de dire 'information management'. C'est pourquoi nous utilisons toujours le mot 'documentation', bien qu'il soit devenu un peu poussiéreux, un peu obsolète, faute d'en avoir trouvé un meilleur.

Il existe donc une multitude de petits centres de documentation qui peuvent être très efficaces, mais qui ont chacun leurs propres objectifs, leur propre public, et qui souvent éditent leurs propres publications. Le fait de posséder une publication, un bulletin bibliographique par exemple, est une espèce de certificat de moralité ou, en tout cas, de respectabilité. Beaucoup d'organismes documentaires ont entrepris de publier des travaux, des bibliographies, etc. qui n'ont pas d'utilité réelle mais qui servent à prouver l'existence de ces organismes et qui leur permettent d'afficher leur nom sur la place publique.

Quand on a tenté de rationaliser les choses, on a parfois réussi à constituer des réseaux; on commence à voir apparaître, en petit nombre encore, des réseaux documentaires spécialisés. Je prends le mot 'réseau' dans le sens que lui donne le contexte documentaire, et non dans son acception informatique; malheureusement les informaticiens, après nous avoir emprunté le mot 'informatique', ce qui est dommage, nous ont ensuite dérobé le terme 'réseau', puis un certain nombre d'autres qui nous manquent beaucoup maintenant. Il s'agit donc ici de réseaux d'information.

Il en existe ainsi p.e. dans le domaine de l'agriculture, dans ceux de l'économie, de l'énergie, de l'emploi, etc. . . . Quelques dizaines au total qui naturellement sont tout à fait isolés les uns des autres.

De la même façon que les centres de documentation classiques constituent une espèce de nébuleuse, on a vu apparaître, plus récemment, toute une série de bases et de banques de données dont les unes sont créées par des organismes administratifs ou gouvernementaux et dont les autres résultent d'initiatives privées. Ces bases ou banques de données couvrent maintenant un nombre assez grand de champs de l'information, et de la connaissance. Beaucoup restent internes, mais un nombre déjà élevé (bien plus d'une centaine) sont publiques et peuvent être consultées en ligne; à tel point d'ailleurs que de telles banques de données sont, dans quelques domaines, déjà concurrentes les unes des autres. Un cas typique est celui de la 'documentation juridique' où existent au moins quatre systèmes concurrents de portée nationale, ce qui ne garantit pas pour autant, aux utilisateurs, des services totalement satisfaisants.

Ces bases sont rendues accessibles par des serveurs. A la différence d'autres pays, aucun effort n'a été fait à l'origine en France pour limiter le nombre de ceux-ci. Plusieurs institutions ont pensé voir là un marché profitable et ont créé des serveurs: très rapidement on s'est trouvé face à une dizaine de ceux-ci, ce qui évidemment était un nombre trop élevé. Par les lois mêmes du marché, un certain nombre sont morts, mais plusieurs sont encore actifs et donnent le courage à quelques organismes d'en créer de nouveaux. La situation est encore loin d'être stabilisée. De toute façon il semble certain que d'ici quelques années, le nombre des serveurs aura diminué. Parmi eux, deux plus importants sont les mieux connus à l'étranger, à savoir: Télésystèmes-Questel et le G-CAM.

Le gouvernement a essayé de faire un choix, il y a quelques années, et a promu un de ces serveurs au rang de serveur national, ce qui signifie concrètement qu'il lui donne des subventions, mais cela ne veut pas dire pour autant qu'il ait une vocation sensiblement plus nationale que les autres. Ainsi il y a là une jungle qui va progressivement s'éclaircir en raison de la lutte pour la vie, qui est une loi de toutes les sociétés.

Mais l'abondance des banques de données consultables en ligne, et le nombre élevé de serveurs, sont encore loin de répondre à tous les besoins des utilisateurs français. Ceux-ci continuent, dans la plupart des domaines, à dépendre très largement des producteurs de données étrangers, particulièrement Nord-Américains. Nous connaissons donc encore une large dépendance intellectuelle et économique par rapport à ces fournisseurs hors frontières.

Une autre caractéristique de notre situation, complémentaire de la précédente, c'est la coexistence entre tous ces organismes d'information – qu'ils soient traditionnels comme les centres de documentation ou plus modernes, comme les banques de données – d'un grand nombre de statuts, de modes de fonctionnement et de modes de financement différents les uns des autres.

J'ai essayé d'établir une typologie de ces organismes, j'y ai renoncé devant leur complexité. Entre ceux qui sont publics et ceux qui sont privés, on ne constate aucune répartition rationnelle. Des sociétés privées à but lucratif ont créé des services d'information ou des banques de données, dans les mêmes domaines que des services publics ou des organismes publics sans but lucratif, comme peuvent l'être les universités.

Tous coexistent sans principe directeur: les meilleurs, c'est-à-dire ceux qui ont des clients, subsistent mieux que les autres; ceux qui sont inutiles finissent par disparaître. Ce foisonnement un peu anarchique, cette absence de coordination me semble être une des caractéristiques de la scène de l'information dans mon pays. Je donne, à titre anecdotique, un exemple assez typique dans le domaine dans lequel je travaille personnellement, c'est-à-dire les sciences sociales. Quelques institutions documentaires importantes ont pris conscience du gaspillage que représentait cette coexistence non régulée et ont essayé d'introduire un petit peu d'ordre. C'est par une initiative privée que quatre institutions se sont groupées entre elles et ont mis sur pied un groupement informel de grandes banques de données du domaine politique, économique et social qui s'appelle SPES (ce qui veut dire tout simplement: sciences politiques, économiques et sociales). Ces institutions essayent ainsi de coordonner leurs actions, d'éviter les doubles emplois et d'avoir un certain nombre de productions communes: nous avons établi p.e. un vocabulaire commun pour l'indexation et l'interrogation des données, qui puisse servir de passerelle aux utilisateurs pour passer d'un des quatre systèmes aux trois autres.

Ce qui me paraît significatif c'est que ce groupement informel a été créé par initiative privée, sans consécration officielle, sous la seule responsabilité des quatre organismes parmi lesquels pourtant trois sont publics. Ce qui n'est pas officiel peut donc parfaitement exister; mais cette discordance entre le statut public et la nécessité d'une initiative privée me semble assez caractéristique de la situation. Celle-ci nous conduit à nous demander si les utilisateurs sont bien servis alors que nous professons que l'utilisateur est le point de départ et le point d'arrivée de tous les systèmes documentaires. Il est à craindre que l'utilisateur français ne trouve pas une pleine satisfaction devant cette dispersion, devant cette complexité et qu'il rencontre beaucoup de difficultés pour choisir la source d'information à laquelle il doit s'adresser, dans un cas déterminé, pour obtenir les meilleures conditions d'accès, qu'il s'agisse d'accès à l'information ou d'accès aux documents.

Par ailleurs, les utilisateurs, selon l'institution dans laquelle ils travaillent ou la région qu'ils habitent, sont dans des conditions tout à fait inégales, très différentes les unes des autres. Voilà pour la description de la situation.

Passons maintenant à l'aspect politique. Comme il s'agit de politique nationale, je crois devoir dire qu'en réalité il n'en existe pas, en ce qui concerne l'information spécialisée. Il y a là une différence considérable avec ce que nous disait notre collège allemand (*see* pp. 193–198). En Allemagne, il y a une certaine philosophie, une certaine conception générale de la fonction que doivent remplir les systèmes documentaires et de la façon dont les pouvoirs publics doivent se comporter envers eux. En France, une telle conception est inexistante, et cela indépendamment de la couleur politique du gouvernement.

Ce n'est pas en effet une question de philosophie politique, c'est une question de non-prise de conscience, par les pouvoirs publics, de l'importance de l'information et de la nécessité d'avoir une politique en matière d'information. Or, en fait nous nous trouvons en face de politiques (au pluriel) ce qui est tout à fait différent et ce qui permet toutes les contradictions. Il existe chez nous un seul organisme à vocation générale, puisque c'est un organisme interministériel, qui pourrait avoir une vision d'ensemble de la scène documentaire; c'est la MIDIST, c'est-à-dire la Mission Interministérielle de l'Information Scientifique et Technique. Information Scientifique et Technique est une expression bien connue; la finale IST se rencontre souvent! (Même à l'UNESCO avec UNISIST.) La MIDIST a des missions limitées et dispose de moyens d'action tout aussi limités mais qui lui permettent néanmoins d'avoir un rôle de conception, de réflexion, d'encouragement à des études d'intérêt général et à leur publication, d'avoir également un rôle de stimulation et de subvention d'un certain nombre d'activités priviligiées. Ses interventions restent donc assez ponctuelles; elle n'est pas un organisme ayant une possibilité d'intervention globale sur le marché national de l'information. Elle n'a pas de rôle fédérateur, ni coordinateur. Il n'y a au total pas d'instance gouvernementale pour laquelle l'information soit une préoccupation prioritaire, et l'information spécialisée se trouve en porte-à-faux entre deux axes de préoccupations des pouvoirs publics. Un premier axe relève de la politique industrielle. Cette dernière existe, ou du moins selon les gouvernements en place, nous connaissons des politiques industrielles successives, qui privilègient un certain nombre de secteurs dont nous, travailleurs de l'information, dépendons plus ou moins directement. C'est notamment le cas du secteur de l'électronique et de l'informatique d'une part et d'autre part du secteur des télécommunications. Ces différentes industries qui fabriquent des câbles, des écrans de télévision, des ordinateurs, et bien d'autres choses, nous donnent des moyens dont ensuite nous devenons dépendants. La politique industrielle vise à la promotion de ces secteurs de l'industrie et ne demande aucunement l'avis des utilisateurs.

Nous, documentalistes, nous sommes des utilisateurs parmi d'autres, parmi les moins riches, les moins influents et il n'est pas question que nos besoins soient pris en considération. Ils ne le sont pas non plus par les télécommunications. On télécommunique, on envoie n'importe quel message; on peut donc envoyer aussi de l'information par les canaux de télécommunication, mais on ne nous demande pas notre avis sur le choix des moyens par lesquels elle est transmise.

Le second axe, croisant celui de la politique industrielle, est celui de la politique tout court. Or, celle-ci s'intéresse à tout autre chose qu'à l'information spécialisée, elle s'intéresse à ce qui peut influencer l'opinion, à ce qui peut attirer le grand public. Elle est concernée par la télévision, par les moyens de communication audiovisuelle. Mais nous qui travaillons dans l'information, nous sommes trop peu nombreux et influents, notre poids électoral est trop faible, pour que nous attirions les regards des responsables politiques. Entre ces deux secteurs privilégiés de politique générale que sont d'une part la politique industrielle et d'autre part la politique de la communications audiovisuelle, nous sommes quelque peu laissés à l'abandon.

Voilà, je crois, une des raisons qui explique l'absence d'une politique de l'information devant laquelle nous nous trouvons. Les responsabilités à cet égard, qui ne sont attribuées à aucune instance gouvernementale en particulier, sont dispersées entre de nombreux ministères et on trouve un peu partout dans l'organisation gouvernementale des mécanismes plus ou moins importants, qui touchent à nos problèmes d'information par un biais ou un autre. Le Secrétariat Général du Gouvernement, organisme exécutif du premier ministre, a ainsi créé un certain nombre d'instances à compétence nationale. Depuis près de quinze ans une Commission de Coordination de la Documentation Administrative se préoccupe de la façon dont l'Administration utilise les moyens informatifs pour rapprocher les citoyens des données qui leur sont nécessaires. Créée plus récemment, une Commission Nationale de l'Informatique Juridique a pour fonction de remettre de l'ordre dans ce secteur, particulièrement chaotique.

Pour sa part, le Ministère de l'Education Nationale a la Direction des Bibliothèques, des Musées et de l'Information Scientifique et Technique qui a compétence pour tout ce qui est de l'information dans le secteur de l'enseignement supérieur, bibliothèques universitaires, etc.: les musées ici nommés étant les musées scientifiques et non les musées des Beaux-Arts qui relèvent d'un autre ministère, celui de la Culture. C'est ce dernier qui est aussi compétent pour toutes les bibliothèques publiques, dont la principale est la Bibliothèque Publique d'Information de Paris, souvent appelée le Centre Pompidou et également pour la Bibliothèque Nationale. Le Ministère des Postes et Télécommunications intervient aussi très activement par sa Direction Générale des Télécommunications qui a des préoccupations de rentabilité très affirmées. Elle s'est donné comme une de ses fonctions essentielles de vendre des communications téléphoniques. Celles-ci coûtent aux usagers, par conséquent font rentrer de l'argent dans les caisses de l'Etat, et des innovations comme le Minitel, même si la majorité des foyers français s'en voient offrir la jouissance gratuite, est un instrument qui revient finalement cher aux utilisateurs. De fait, la Direction Générale des Télécommunications est une des rares administrations qui soit productrice de ressources et non pas dépensière. Mais cette situation l'entraîne à intervenir dans des infrastructures qui sont nécessaires pour le transfert de l'information.

Nous avons encore un Ministère des Techniques de Communication, qui s'occupe de la télévision parmi d'autres médias, utilisant ou non les satellites. Nous avons aussi un Ministère de la Recherche et de la Technologie, dont dépend notamment le Centre National de la Recherche Scientifique . . . qui gère une partie importante de la recherche publique. Non pas la totalité, bien entendu: la recherche militaire, importante comme partout, dépend du Ministère de la Défense; la recherche médicale, la recherche agronomique etc. échappent aussi au CNRS. Celui-ci n'en a pas moins compétence sur un grand nombre d'unités de recherches, et il a créé une Direction de l'Information Scientifique et Technique, qui s'occupe surtout de diffusion des connaissances, de vulgarisation, de culture scientifique et aussi de l'information nécessaire aux chercheurs.

Beaucoup de ministères tels ceux de la Défense, de l'Agriculture ont créé de même des Directions de l'Information Scientifique et Technique. Un des soucis principaux de ces différentes Directions est de développer leurs propres ressources d'information, sans liaison avec les autres systèmes d'information publics ou privés. Une des constantes d'une administration complexe comme l'Administration Française est la difficulté de communication entre les divers départements ministériels. Les spécialistes de l'Administration connaissent bien ce phénomène, qui constitue une raison de plus pour que l'existence d'une politique nationale de l'information soit peu probable.

Peut-il alors y avoir une concertation entre les responsables politiques et les milieux professionnels? Il faut ici remarquer qu'en France, à la différence notamment de la Grande Bretagne, pour autant que je comprenne les choses britanniques, il n'y a pas une profession de l'information, une profession reconnue, constituée, délimitée, avec des règles, etc. Il y a des professionnels qui exercent des métiers différents. La profession en tant que telle n'est pas organisée. C'est clair, par exemple, quand on regarde les nomenclatures officielles: notre Institut National de la Statistique et des Etudes Economiques a établi en 1983 une nouvelle nomenclature des catégories socio-professionnelles dans laquelle nous avons beaucoup de peine à nous retrouver. On y trouve des termes très généraux comme bibliothécaire ou archiviste, mais il n'y a aucune définition précise permettant de savoir qui est classé dans ces catégories et qui ne l'est pas. De sorte qu'il est actuellement impossible de dire avec une précision satisfaisante combien il y a en France de personnes exerçant cette profession. On se base sur des estimations, des recoupements, mais on n'a pas de possibilité d'un recensement réel. Cette situation de multiplicité professionnelle se traduit dans la pluralité des associations professionnelles qui regroupent chacune une partie seulement des travailleurs de l'information. Cette multiplicité, dans notre pays, conduit à une relative faiblesse des dites associations, aucune n'ayant le poids suffisant pour exercer une action réelle sur les pouvoirs publics.

Par suite le dialogue ne s'établit guère, les associations sont très rarement associées aux préoccupations des pouvoirs publics ou même simplement consultées sur ce qui intéresse leurs membres. Des contacts ne sont pris qu'au coup par coup et de façon sporadique. Cette situation, préjudiciable aux associations professionnelles, a conduit, depuis quelques années, à des efforts de concertation entre les principales associations du domaine de l'information, pour tenter d'agir en commun. Nous sommes moins avancés que nos amis britanniques, puisque ceux-ci ont su créer un comité consultatif qui réunit cinq associations. Nous sommes cependant sur la même voie; nous avons constitué depuis plusieurs années un groupe informel de représentants de nos principales associations, y compris d'ailleurs les associations d'anciens élèves des principaux établissements de formation. Notre système de formation est en effet, beaucoup moins systématisé que le système britannique. Nous avons des écoles, des filières de formation mais un ensemble hétérogène. Il en résulte qu'il s'est créé diverses associations d'anciens élèves de ces différentes écoles qui ont chacune des intérêts spécifiques à défendre.

Les représentants autorisés de ces différentes associations, une dizaine en tout pour le moment, se réunissent régulièrement depuis quelques années pour se concerter sur les problèmes d'intérêt commun mais en gardant chacune, et c'est peut-être aussi caractéristique de l'individualisme français, un grand souci d'autonomie et de non-embrigadement.

Detail anecdotique: au début, comme il fallait identifier ce regroupement, mais sans lui donner de forme institutionnelle, il semblait commode d'avoir au moins un nom en commun, et on l'appelait 'l'Interassociation'. Mais certains des participants ont trouvé que le mot Interassociation rendait un son trop institutionnel et ils ont demandé qu'on l'abandonne. Ce groupement donc n'a plus de nom. Nous l'appelons chacun comme nous le voulons. Dans mes notes je le désigne comme ABCD, puisqu'il rassemble des archivistes, des bibliothécaires, des conservateurs de collections publiques et des documentalistes. Mais ce n'est pas un nom officiel!

Quoi qu'il en soit nous avons signé, en 1983, un protocole d'accord en vertu duquel nous tâchons de nous entendre devant un certain nombre de problèmes. Nous avons notamment constitué depuis un an, un groupe de travail qui comprend des représentants de toutes les associations intéressées et qui essaye d'élaborer une sorte de plate-forme 'politique'. Nous nous sommes attelés à la rédaction d'un document qui doit expliquer aux pouvoirs publics notre vision d'une politique nationale de l'information.

Nous espérons le terminer en juin 1985, et nous serons heureux de le communiquer aux associations-soeurs des pays voisins. Nous ferons de notre mieux alors pour qu'il soit pris en compte par les pouvoirs publics. Tel est en tout cas le type d'action que peuvent engager les associations professionnelles.

J'ai insisté jusqu'à présent sur l'absence d'une politique systématique et concertée; le regret que nous éprouvons ne doit pas cacher l'aspect positif des choses. A défaut d'une action commune vers un objectif bien défini, des actions dispersées venant de centres d'initiative isolés les uns des autres ont obtenu, au cours des récentes années, plusieurs résultats positifs. On a réussi notamment dans notre pays, comme en Allemagne, ou en Grande Bretagne, à renforcer quelques secteurs documentaires auxquels on attache sur le plan national une importance particulière. La chimie a été priviligiée, comme dans d'autres pays, et nous avons maintenant un potentiel d'informations relativement important dans ce domaine, de même que dans les sciences bio-médicales ou dans les sciences de la terre. C'est là un premier point d'acquis.

Deuxième point positif: l'amélioration des infrastructures. Il est certain que nous disposons maintenant d'infrastructures de communication permettant le transfert de l'information, qui sont sensiblement plus satisfaisantes qu'elles ne l'étaient il y a un certain nombre d'années, à commencer tout simplement par le téléphone. Je ne trahis pas de secret de Défense Nationale en disant que le réseau téléphonique en France était, il y a quinze ans, bien insuffisant. Maintenant, on obtient facilement ses correspondants, ce qui est nécessaire quand on dispose d'un modem et qu'on veut se brancher sur une banque de données. La consultation à distance est donc devenue facile. On a créé des réseaux qui ont permis notamment le développement du videotex, etc. Un certain nombre de techniques, devenues d'usage courant, relèvent de ce progrès des infrastructures, ce qui est certainement un élément positif.

On a d'autre part réussi à constituer quelques grands équipements documentaires: là je ne parle plus d'équipement mécanique ou électronique, mais proprement de ces équipements documentaires qui nous manquaient depuis très longtemps, nous le savions, mais qu'on n'avait jamais pu mettre sur pied. Pour y remédier on a réussi à établir une véritable coopération entre un certain nombre d'établissements ou d'institutions. Un de ces systèmes s'appelle ORIADOC, réseau national d'information sur les unités documentaires. Depuis longtemps, nous voulions avoir un recensement véritable des unités documentaires existant en France; nous estimons qu'il y en a à peu près huit mille de toutes dimensions, mais à cause même de ce nombre élevé, il n'avait jamais été possible d'en faire l'inventaire. Depuis quelques années, à l'initiative de l'Association Française des Documentalistes et es Bibliothécaires Spécialisés, qui a établi un programme global et qui a réussi à obtenir l'appui des pouvoirs publics, il s'est constitué un réseau reposant sur des organismes de collecte qui existent maintenant dans toutes les régions du territoire national. En outre, nous avons identifié un centre de traitement, nous avons obtenu des fonds des pouvoirs publics et nous avons constitué une banque de données coopérative, qui rassemble, sur la base d'un bordereau de collecte commun, des données sur toutes les unités documentaires existant en France, avec un programme de mise à jour triennal concernant à tour de rôle chacune des régions. Dès maintenant les données relatives à cinq régions sont disponibles en ligne.

Cette année, 1985, il devrait y en avoir une dizaine de plus, l'année prochaine seront couvertes les dernières régions. L'année d'après, les cinq premières régions seront mises à jour, et ainsi de suite. C'est là un résultat positif.

Un autre progrès certain, est d'avoir réussi à constituer un catalogue collectif national des publications en séries. Notre pays avait pris un retard regrettable dans ce domaine. Quelques pionniers, dans les années 70, avaient échoué à le combler.

Récemment, ils ont enfin pu faire prendre en charge l'opération par la Direction des Bibliothèques, des Musées et de l'Information Scientifique et Technique que j'ai mentionée antérieurement. Celle-ci a assumé la responsabilité de ce catalogue collectif national, auquel elle a conféré d'ailleurs un statut de semi-autonomie et qui fonctionne maintenant de façon satisfaisante. Nous avons pu enregistrer les données afférentes à quelques 200,000 publications en séries et le catalogue informatisé est régulièrement tenu à jour. Il est accessible en ligne de façon très facile: on peut l'interroger sur un terminal classique ou sur un Minitel. Un certain nombre de centres de documentation d'une importance suffisante ont reçu des mots de passe, ce qui leur permet de mettre à jour leur propre état des collections, sans pouvoir toucher bien sûr aux descriptions bibliographiques. Le système autorise une mise à jour très rapide et une consultation facile. C'est un instrument de travail dont nous avions besoin depuis longtemps. Complété par un système de messagerie électronique il permet maintenant de faire fonctionner efficacement le réseau de prêt interbibliothèque, parce qu'on peut localiser immédiatement la bibliothèque dans laquelle se trouve le périodique dont on recherche un article.

Malheureusement, nous n'avons pas encore de catalogue collectif des ouvrages, mais cela ne saurait tarder. Des études préliminaires sont engagées; il devrait voir le jour dans les cinq prochaines années.

Un autre résultat qui a été obtenu un peu de la même façon que le catalogue collectif des publications en séries est le réseau de ce qu'on appelle des CADIST, à savoir les Centres d'Acquisition et de Diffusion de l'Information Scientifique et Technique. C'est un système englobant une vingtaine d'institutions documentaires importantes en France qui coopèrent entre elles et se sont partagé les tâches pour rendre des services comparables à ceux que rend en Angleterre, en Europe et ailleurs la BLLD, la Bibliothèque de prêt de la British Library, c'est-à-dire permettre d'obtenir en communication les documents ou les photocopies de documents que l'on ne trouve pas dans sa biliothèque de premier recours.

Dernier point que je voudrais mentionner, ce sont les progrès de la politique de décentralisation. Ils me semblent constituer l'évolution la plus remarquable dans notre système actuel. Les pouvoirs publics ont mis en oeuvre depuis plusieurs années une politique générale de décentralisation; celle-ci trouve sa traduction dans le domaine de l'information. Les professionnels de l'information s'attachent pour leur part à monter un certain nombre de mécanismes qui traduisent sur le plan de l'information les mêmes incitations, les mêmes volontés que la politique de décentralisation sur le plan général.

C'est ainsi qu'un effort considérable est fait, en ce moment, pour mettre en place ce qu'on appelle: les services communs de documentation des universités. Il existe chez nous environ 70 universités. Dans des villes importantes comme Bordeaux, Lille, Strasbourg, Lyon, etc., il y a deux ou même trois universités: au point de vue de la documentation, elle forment alors un ensemble appelé interuniversitaire, disposant d'un service interétablissement de coopération documentaire.

Ces services communs ou interétablissements de documentation intégreront les bibliothèques universitaires ou interuniversitaires et toutes les unités documentaires internes aux universités indépendamment des précédentes. Actuellement, dans une grande ville universitaire comme Grenoble ou Lille, à côté de la bibliothèque universitaire existent au moins une cinquantaine de services de documentation sectoriels plus ou moins spécialisés. Ceux-ci se sont créés à l'initiative de telle ou telle unité d'enseignement, de tel ou tel professeur . . . sans aucune coordination.

Cela représente un gaspillage de moyens et ne permet pas une utilisation optimale des ressources. On essaie maintenant de coordonner ces activités dans chacun des centres universitaires répartis sur tout le territoire.

De même, on a installé des Agences Régionales d'Information Scientifique et Technique, auprès d'une vingtaine de Chambres de Commerce et d'Industrie dans la plupart des régions françaises, agences qui ont comme fonction principale de mettre à la disposition des petites et des moyennes entreprises l'information dont elles ont besoin. Les grandes entreprises ont naturellement leurs sources d'information bien organisées, mais les petites entreprises industrielles étaient beaucoup plus démunies. Les agences régionales permettent maintenant d'irriguer en quelque sorte toutes les entreprises, sur le territoire français, par de l'information captée à toutes les sources possibles.

Dernier exemple, le Ministère de l'Environnement a mis en place récemment un réseau documentaire appelé ECOTHEK, qui est un réseau de banques de données sur l'environnement local. Or, à ce réseau coopérent à la fois le Ministère de l'Environnement qui est un service central et les Conseils généraux, c'est-à-dire les assemblées départementales qui maintenant détiennent le pouvoir exécutif dans chaque département dans le cadre de la décentralisation politique.

Cette coopération documentaire entre des collectivités territoriales et le gouvernement central est pour nous, en France, quelque chose de tout à fait nouveau qui est en train de se mettre en place et qui me semble une des directions dans lesquelles des progrès décisifs peuvent être attendus dans les prochaines années.

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Appendix. Does France have an information policy? A summary in English

Pamela Mayorcas-Cohen
Terminology and Computer Applications, Commission of the European Communities, Luxembourg

The lack of any policy on information in France can best be explained by first describing the infrastructure of the documentation sector in that country.

France has a few major documentation services, some of which being better organised or better equipped than the rest, have acquired a central role. One such example is the French Petroleum Institute which serves as the main source of information and documentation on petroleum. In addition, there are a multitude of small, highly efficient, documentation centres each serving their own public. Many issue their own publications, such as a bibliographic bulletin, merely in order to herald their existence. Some attempts at rationalisation have resulted in the establishment of several dozen specialised and totally independent documentation networks in areas such as agriculture, economics, energy and employment.

More recently large numbers of databanks and databases have appeared on the scene, set up as a result of public or private sector initiative, which provide reasonably broad coverage of the whole field of knowledge. No control has been exercised on the growth of host services, of which there are almost a dozen, with a queue of candidates waiting to take the place of the casualties in what is regarded as a highly-profitable growth area. The situation is expected to stabilise in a few years, leaving a small number of hosts which will almost certainly include the two best-known outside France: Télésystèmes-Questel and G-CAM.

In spite of the large number of information and documentation centres, the abundance of online databases and the large number of hosts, the French user remains heavily dependent both intellectually and economically on foreign data producers, and on North American information providers in particular. The French information sector contains a large number of major resources, which are highly dispersed, poorly exploited, and which do not guarantee the French user sufficient autonomy in information. The lack of direction, anarchic growth and total absence of any kind of co-ordination presents the user with a bewildering range of services and complex choice as to the best source of information or the best conditions of access.

Unlike other countries, such as West Germany, France has not developed any policy on the role of documentation services or the way they should be treated by public authorities. The only organisation with any generalised

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responsibility is MIDIST (Mission Interministérielle de l'Information Scientifique et Technique) the Interministerial Service for Scientific and Technical Information which nevertheless, with limited resources and means at its disposal, can sponsor and publish specific studies and act as a general think-tank.

The Government Secretariat-General, which is the executive arm of the Prime Minister's Office, has set up a number of bodies at national level. For almost fifteen years, a Commission for the Co-ordination of Official Documentation has been studying the government's use of information channels for transmitting essential information to the general public. More recently, the National Commission on Legal Data Processing has been set up in an attempt to bring some order to a particularly chaotic sector.

The Directorate for Libraries, Museums and Scientific and Technical Information of the Ministry for National Education is responsible for all information services in the higher education sector, in university libraries and in the scientific museums. The fine arts museums come under the Ministry for the Arts which is also responsible for all public libraries, including the Paris Public Information Library (Bibliothèque Publique d'Information de Paris), better known as the Pompidou Centre, as well as the National Library. The Ministry for Post and Telecommunications exerts considerable influence on the design of infrastructures for the transmission of information through its Directorate General for Telecommunications.

Another ministry, the Ministry for Communications Technology is responsible for television and other media, including satellites. The National Centre for Scientific Research (CNRS), which comes under the Ministry for Research and Technology, manages a significant proportion of the national research budget and is responsible for a large number of research units. It has set up a Directorate for Scientific and Technical Information in order to disseminate information, promote scientific education and provide essential information for research staff. However other areas of research, including military, medical and agricultural research all fall outside the responsibility of the CNRS and several ministeries have set up their own Directorates for Scientific and Technical Information, in order to develop their own resources, independently of existing public or private information systems.

Unlike in Great Britain, there is no clearly defined and recognised information profession. In 1983 the National Statistics and Economic Studies Institute (INSEE) introduced a new nomenclature for the socio-professional categories. It includes general terms such as librarian or archivist with no clear definition to indicate who falls within which category. The professional associations are correspondingly fractionated and weak, unable to exercise any real influence on government. In the absence of any regular and co-ordinated dialogue between the professional associations and between them and the public authorities, an informal group of ten representatives of the main associations, including the associations of former students of the main training establishments, was set up in the early 1980s. In 1984 a working party was set up in order to develop a common political platform and to produce a document setting out to the public authorities the group's ideas for a national information policy.

A number of major conventional documentary tools have been established. The national network for information on documentation centres, ORIADOC, is an inventory of all documentary services in France, totalling some 8,000 of every size. The French Association of Information Scientists and Special Librarians (ADBS) obtained public funds in order to set up the network based on the deposit centres which now exist in every region in France. This should be completed in 1986.

A national union catalogue for serials is managed by the Directorate for Libraries, Museums and Scientific and Technical Information but has a semi-independent status. Data on some 200,000 serials has been entered and the computerised catalogue, which is regularly updated, can be accessed using conventional or Minitel terminals.

Unhappily, there is still no union catalogue for books but preliminary studies are under way and such a facility should be available in the next five years.

The Centres for the Acquisition and Dissemination of Scientific and Technical Information (CADIST) constitute a network of about twenty major documentary services in France which offers services comparable to those provided by the British Library Document Supply Centre.

Lastly, the general trend towards decentralisation pursued by central government has also had repercussions in the information sector. For example, work is currently in progress to set up joint university documentation centres. Similarly, Regional Agencies for Scientific and Technical Information have been established in about twenty Chambers of Commerce and Industry covering most of the French regions. Their main function is to provide information for small- and medium-sized firms which are less well catered for than the big companies which generally have their own in-house services. The Minister for the Environment has recently set up a documentary network, ECOTHEK a network of databases on local environmental matters, which relies on collaboration between the Ministry and the General Councils (Conseils Generaux) or regional executives.

Co-operation on information and documentation between regional authorities and central government is a totally new development in France and an area in which a lot of progress can be expected in the next few years.

Translator's note

Documentation – the author has used the words *documentation* and *documentalist* in its broadest sense, there being no single term in French, as in English, to cover all the activities which come under the heading of library, documentation, information or archive work.

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A note commenting on 'Vocabulary control and information technology' by Derek Austin

Harold Borko
Professor, Graduate School of Library and Information Studies, University of California at Los Angeles

In the January 1986 issue of Aslib Proceedings, *an article by Derek Austin entitled 'Vocabulary control and information technology' appeared. In this article, Austin quoted some of Harold Borko's writings, and while the quotes are accurate, Borko would like to provide some elaborations and explain his position in a little more detail.*

The 4th International Conference on Classification Research was held in Augsburg, West Germany, in 1982. Derek Austin, I, and many other concerned individuals attended this conference and were stimulated by the presentations and discussions. The conference papers were published[1], and more recently Austin published an article entitled 'Vocabulary control and information technology' in *Aslib Proceedings*[2] in which he discusses his views and mine on the benefits of vocabulary control in computer-based document retrieval systems. I am not arguing with these comments, nor am I trying to change, Austin's views; I do, however, want to present my own views in a somewhat more sympathetic context. Let me state at the outset that Austin has quoted me correctly. At the Augsburg conference we spent considerable time together discussing the retrieval effectiveness of automatic indexing as compared to the use of a controlled vocabulary, and we recognise that our views differ.

It is my claim, based on numerous experimental research studies, that in a fully-automated retrieval system, subject searching based on matching query terms with keywords extracted from the natural language of documents by computer processing, will be less expensive and no less effective than subject searching using manually-derived index terms.

The idea of a fully-automated retrieval system needs elaboration. It connotes a system that receives machine-readable inputs to the databases, uses machine indexing, and depends upon relevance feedback from the user to improve search effectiveness. Many, or even most, articles are now prepared for publication by word processing, and computer typesetting is becoming ever more common. So it is only a minor extrapolation from the present to conceive of a retrieval system that would receive machine-readable manuscripts, at least the titles and abstracts of articles, as input for inclusion in the database. Certainly this procedure will be more cost-effective than rekeyboarding a typed manuscript.

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The fully-automated retrieval system will use machine indexing and not manual indexing. The unindexed documents will be processed by computer, and keywords will be extracted and arranged in an inverted file. Many variations of machine indexing are being developed including attempts at automatically creating a thesaurus and a controlled vocabulary, and no doubt these processes could be improved. Even today, the simple methods of machine indexing are cheaper and faster than human indexing. But is machine indexing effective? Is it as effective as human indexing?

I believe, and I have stated this in the past, that consistent, high-quality, human indexing will provide the best retrieval results. The problem is that not all human indexing is consistent from one day to the next, or from one indexer to the next, nor is all manual indexing of high quality. Austin is aware of this, and indeed one of the benefits of PRECIS is that it seeks to achieve consistent quality indexing. And the various national and international standards on indexing, plus textbooks and teachers, all try to improve indexing quality. However, the problem remains; too much of manual indexing done today is inconsistent, of poor quality, and it is costly.

For all of these reasons, I and others, have concluded that machine indexing is more cost-effective than is manual indexing. Still it must be recognised that a search strategy that matches the keywords in a query with the keywords derived by machine indexing is likely to achieve poor results initially. Consequently, Salton[3] proposed the use of 'relevance feedback' – a procedure which requires the user to identify a few relevant and a few non-relevant references retrieved through the initial search. The keywords in these documents are used to modify the search request which is then resubmitted. Generally two to four iterations are needed until the user is satisfied with the results of the search.

To demonstrate the effectiveness, or rather the ineffectiveness, of machine indexing, Austin conducted a search for documents on 'yellow light'. This is a jargon term which, we are told, 'refers to European Community requirements concerning legal minimum levels of illumination in some kinds of working areas'[4]. When 'yellow light' was used as a search term, no documents were retrieved. I'm not surprised. This is a jargon term, and it is unlikely to be used by many authors. I also doubt whether 'yellow light' is a controlled-vocabulary index term in any of the databases searched, and therefore it should not have been used in formulating a search request. Indeed, I would hypothesise that one would be more likely to make a match on 'yellow light' using the natural language of the document rather than as an index term. Be that as it may, no matches resulted, and so a Boolean search was made linking 'together such terms as "light", "law", "legal", "legislation", etc. The machine reported a total of thirty-two hits, and these were printed offline and sent through the mail. Not a single item was relevant'[5]. Six of the retrieved references were reproduced in Figures 1 and 2[6]. Let's consider the formulation of the search request and the obtained results.

First of all, even Austin admits that, 'The examples of print-out shown in Figures 1 and 2 may not be completely typical; most searches retrieve at least some relevant items'[7]. True, so perhaps this was not a very good search strategy. Also, if unsatisfactory results are obtained, the search request should be reformulated and resubmitted. This was not done. Furthermore, I find it hard to believe that the librarian conducting the search would have the output 'printed offline and sent through the mail' without examining the results or even reading the titles of the articles retrieved. Austin is trying to make the point that the time spent, either by the searcher or the end-user in eliminating non-relevant documents adds to the cost of the search. Agreed, but I submit that the time and cost involved in scanning and eliminating these non-relevant references is far less than is the time and cost involved in manually indexing these same articles.

No one, neither I nor Lancaster, nor other researchers in automatic indexing, ever claimed that perfect results would be obtained. We are all too aware of the problems inherent in machine indexing. We are also aware of the deficiencies of manual indexing. What we do claim is that retrieval systems using machine indexing, relevance feedback, and the iteration of the search requests produces results that are usually no worse than those obtained using manual indexing together with the modification and iteration of the search request. What usually happens is that about the same number of relevant documents are retrieved by both procedures, but these may be different documents, and possibly more non-relevant documents may be retrieved using machine indexing and an uncontrolled vocabulary – that is precision is likely to be lower.

In spite of these deficiencies, it is my claim that because machine indexing is faster, cheaper, more consistant, and about as equally capable as human indexing, it is more cost-effective.

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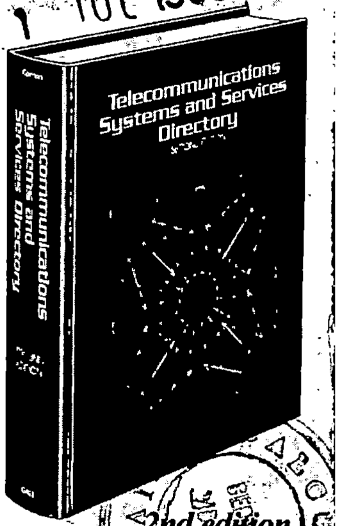

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